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ABSTRACT

Three related activities are reported in this study. One is the development of two data banks designed to supply children with information about many aspects of life in world culture. The entire data bank system was piloted by second-grade, middle-class children with self-administering orientation units developed to introduce students to the data retrieval process and to present them with instruction and learning tasks. Second, a set of studies were conducted to explore the use children would make of the banks. These studies led to development of a set of principles on which first-generation information systems can be built for children. Last, several investigations were designed to explore the relevance of the data banks as settings for teaching concepts and inquiry systems from the social sciences and also to explore the utility of the data banks as settings for research into the social science education of children. (Author/DE)

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DATA BANKS FOR CHILDREN: DEVELOPMENT AND INITIAL STUDIES

by

Bruce R. Joyce
Elizabeth H. Joyce

Teachers College, Columbia University

New York, New York

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SUMMARY

Three related activities are reported herein. One is the development of two data banks designed to supply children with information about many aspects of life in world culture. The second is "engineering" research designed to develop principles on which information systems can be developed and used as settings for teaching concepts and modes of inquiry drawn from the social sciences. The third is the exploration of the "data and storage retrieval setting" as a place to do research on the social education of children.

The Development of the Data Banks

The index system for the data banks was adopted from the Human Relations Area Files, and included over six hundred categories covering the spectrum of human activities as described in the categories used by anthropologists. With respect to a New Mexico Pueblo and a "mainstream" American town, data were collected and reorganized into the categories, with rewriting to make the material intelligible to primary grade children. The results were document files with over 3,000 entries including pictures, written material, legends, charts, graphs, maps, etc. In addition, the written material in each category was accompanied by an audio tape recording which repeated the same material. These tapes were intended as an aid to students who had difficulty reading the material.

The entire data bank system was piloted with second grade middle-class children and all written material and pictures were reduced to thirty-five millimeter photographic slides. Self-administering orientation units were developed to introduce students to the data retrieval process and present them with instruction and learning tasks.

The "Engineering" Research

A set of studies were then conducted to explore the use children would make of the banks and to develop guidelines for the development of information systems for children in the social science domain. In each study the focus was on the "input" variables (questions asked and categories of information explored by the children) and "output" variables (themes generated and concepts developed by the children when solving the learning problem or completing the assigned learning task).

The Free Inquiry Study asked children to learn about the Pueblo culture until they were ready to teach another child about it. It revealed that children could use the systems, but that the lower class second children had great difficulty with it. Fourth and sixth grade students explored similar aspects of the culture, with few of them examining the less tangible aspects of the culture or its social dynamics. Input and Output variables were related at the sixth grade level, but not the fourth.

The "Business Task" Study was conducted with fourth and sixth grade students matched to the "Free Inquiry" sample and a group of third grade students as well. The "business task" represented a somewhat more structured activity and asked the children to determine what would be a good business to start in the town. The third grade students could use the banks adequately and differences among the three grades were small especially with respect to the content of the inquiry (the categories explored and the content of the cultural descriptions that emerged). Again, sixth grade input and output were related, but fourth grade input and output were not. The comparison of behavior in the free inquiry (instructional) and business (moderately structured) tasks indicated that both input and output were greater under free inquiry conditions. Content of input and output, however, was similar. In neither task was strategic inquiry reflecting social science knowledge detectable in very many cases. The children asked "common sense" questions and gave "common sense" answers in most cases.

The "Cultural Comparison" Study asked groups of third, fourth, and sixth grade children to compare life in the two towns. A self-administering "question stimulator," drawn from questions social scientists explore, was given to one treatment group.

The children were able to approach the task, again not in a "social-science-wise" way. Younger and older children compared the cultures on the same content bases and explored the same kinds of questions. The "question-stimulator" apparently increased input but did not affect output. Some groups engaged in dialogue over the data they retrieved and others did not. The entire pattern indicated that it is possible to build self-administering systems that can orient children to the study of cultures and teach them to ask social science-based questions, but that investigation is needed of how to improve their group process and increase the level of group discourse.

The "Learner vs. System Initiation" Study (Chapter Eight) employed matched groups at the third and fifth grade level. One treatment group engaged in "free inquiry" while the other received the input of their matches. Output was not significantly different. The result raises a host of questions about the conditions affecting information utilization by children and much further study is needed in this area.

The "Category Variable" Study (Chapter Eleven) was designed to investigate the effects of changing the category system on output. A short (thirty-five) category system was based on the questions asked most frequently by children in the previous studies. Matched groups were employed, both engaging in the free inquiry and on using each category system. When intelligence was considered, interaction with treatment was significant. The less intelligent children seemed to benefit from the new system whereas the more intelligent system explored many more categories under the old system and did not benefit, apparently, from the new system.

Entry system appears to be a meaningful variable and its relation to learner characteristics suggests that a system might be developed which would have adaptability to learner style.

The Aid-Given Study explored the needs for help that the children manifested throughout the investigations. A tabulation was made by the aid rendered by research assistants throughout the investigations. It revealed that help with audio-visual devices and retrieval was not great above the second grade level. However, there were many requests for help in reading specific words despite the fact that few of the children used the tapes. We concluded that children prefer specific to general assistance with reading and that an appropriate self-administering support system should be developed, with the tapes being used as information sources rather than as aids for reading.

The totality of the above studies result in a set of principles on which first-generation information systems can be built for children, complete with self-administering orientation devices, adjustable index systems, and appropriate support devices.

Data Banks and Social Science Education

Several investigations were designed to explore the relevance of the data banks as settings for teaching concepts and inquiry systems from the social sciences and also to explore the utility of the data banks as settings for research into the social science education of children.

The Concept Validation Study asked third and fifth grade students to determine the "fit"of social science concepts of varying complexity to life in two communities. Third grade students had difficulty with the more complex concepts suggesting the need for a series of studies into the kinds of concepts children of different ages and other characteristics can deal with. In general the concepts drew the students into areas of inquiry not explored by many children in the less structured studies and the self-administering devices for presenting concepts were successful, suggesting that instructional systems can be based on the concepts if provision is made for adjustment to the level of the learner.

Further research to develop a "map" of the kinds of concepts can be validated by children of various characteristics appears indicated and viable within the data banks setting.

The Problem-Solving Study presented two groups each of fourth and sixth grade students with problems relating to the communities on which the banks were based. One group was then presented with a set of problems to solve while the others engaged in free inquiry tasks. At the conclusion of the treatments both groups solved yet another problem. The results indicated that students could engage the problems, that the self-administering "problem-presenters" were effective, and that the practice in problem-solving was effective, especially with the older children.

The development of problem-centered units and programs to improve problem-solutions appears worthwhile as well as the development of a research plan to investigate and improve children's modes for approaching and solving problems.

In Sum, the activity has resulted in prototype data banks for children, a base of principles for first-generation operational data banks, and the beginning of fresh lines of research into social science education.

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Bruce and Betsy Joyce
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CHAPTER ONE

DATA BANKS FOR THE SOCIAL STUDIES:

AN ATTEMPT TO MEET AN INFORMATION CRISIS

Two threads can be found in the work reported here. One is the effort to develop informational support systems in the social studies domain--systems designed to assist the inquiry of children. The second is the development of a setting in which the social science education of children can be examined through experimental studies under relatively controlled conditions. The engineering research attendant to the first effort was conducted to illustrate the possibilities of the second.

The Informational Crisis in Elementary Schools

In a world which otherwise explodes with information and sources, the elementary school classroom often seems left out. Libraries are better than they used to be, but even today only slightly more than half of the elementary schools in the United States have their own library. In the critical area of contemporary world cultures and United States and world history, stocking the library is not easy. Except in the topics of long-standing popularity (Mexico and Japan are examples) relatively few books, films, and filmstrips are available, and even in those topics there is great duplication of information among the sources. (Recently the authors examined eight fairly new children's books on India and estimated that any one of the books contained about 80% of the information contained in all of the others.)

Therefore, there are many important social studies topics for which children and teachers have a real struggle if they are to obtain adequate information. Russia, Indonesia, Communist China, and Latin America are striking examples where the struggle is very steep. Information sources about many important events in American History are scarce. To teach a substantial unit on the War of 1812, for example, requires a Herculean materials-gathering effort. To study the evolution of an American city. . . .

The current curriculum projects in the social studies have had to expend much energy trying to overcome the informational drought. Nearly all of the projects have developed the information sources relative to the methods and topics they have selected.[1] To improve the social studies significantly a great change must be made in the informational situation of the elementary school.

Student Initiative and Information Sources

One of the major efforts in library science in recent years has been directed at making informational sources more available to students in such a way that the flow of information is directed by the initiative of the student. Plans for the general operation of libraries have had this intent (Ellsworth, 1965). The development of Dial-Access systems has provided electronic devices for linking students to storage centers for instructional modules and information sources. The concept-film, the cartridge-loading tape recorder, and the suggestions for developing banks of television-tape sources, are, at root, attempts to build an informational environment that will respond to the student's request for data or skills.

This entire set of efforts strikes at what has been one of the most serious problems of inductive and learner-centered teaching strategies in the school setting--the problem of making available to the student sufficient data to support inductive activity or independent study.

Support Systems for Children: The Idea of Data Banks

An inquirer who wishes to enjoy both freedom and power with respect to information sources needs several conditions:

1) He needs access to a very wide variety of information--much wider than he will ever want for any specific purposes, because he has to decide what is and is not relevant to his inquiry. When a packager of information selects only what he thinks students of a given age will need, he prevents the learner from having one of the most important types of choice experiences.

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[1] For example, see the products of: The Georgia Anthropology Project, Marion Rice, Director; the University of Chicago Economics Project, William Rader, Director; The Study of Man, Education Development Center.

2) He needs to control the order in which he obtains information. When studying a nation, for instance, he needs to be able to obtain political information when he wants it, economic information when he wants that, and so on, without having to wade through information he does not want at that time. The disadvantage of long informational film, for example, is that the learner loses control of order. What he needs is random access to relatively short informational units or modules, stored under a great many categories so that the learner can enter where he chooses.

3) He needs to have the information stored in media combinations that permit him to draw on the media that suit his style, capability, and purpose at the time. If he has difficulty reading, for example, he should be able to increase the amount he listens and observes.

4) He needs information sources which are as close to the original data as is possible. The more we intervene as authors and editors, the less close the inquiry is to the reality which is being studied.

5) He needs "facilitation without smothering." That is, he needs to be able to get assistance in procuring information without being interfered with continually. He needs to be and to feel that he is in control of his search for information.

The purpose of the developmental activity reported herein was to build a support system for elementary school students which satisfies the above five conditions.

The chief activity was the development of prototype data storage and retrieval systems that could be used by children as young as six years old, although optimal use was not expected before age eight or thereabouts. Each system was based on a community, the first on a Pueblo in the Southwestern United States and the second on a New England town. The major effort was developing those two systems and conducting research on the use which children could make of them. (Subsequently several other systems have been developed, creating a set of six.)

The intent was to create data banks representing a wide spectrum of information on each community. The information was stored in relatively short units or modules using several media (print, pictures, and audio tapes) in a very large category system to which the students had random access. Research was conducted to determine what kinds of use children could make of these information systems and to probe certain ways of improving the systems and engineering others.

The result of the effort is knowledge about one way of providing informational support systems that relate directly to the learner--as contrasted with support systems intended for the teacher or to be mediated through the teacher.

We consider the developmental effort to be successful in the sense that the know-how now exists for developing such support systems. (Although, the technology will become much more sophisticated.) In addition, the developmental effort has resulted in a promising laboratory for studying the social inquiry of children and the completed research, while only a bare beginning, lays a reasonable base to build on.

The Plan of the Work

Two kinds of work were carried on. One was the development of the data storage and retrieval systems. The second involved introducing children (several hundred in all) to the systems under varying conditions to study their use of the systems and to develop ideas for improving the technology.

The Developmental Plan

The objective was to make a prototype data storage and retrieval system in a form which could be used easily by elementary school children.

A Pueblo was selected for the initial system because it represents cultural elements that are different from the majority United States culture, but also includes influences from the dominant U. S. themes, because great quantities of information are available (from records of the Spanish occupation of the 1500's to present-day town plans), because it is relatively easy to get to (to take pictures, interview citizens, etc.) and because an anthropologist who has been associated with it for the last twenty years, Charles Lange of Southern Illinois University, was willing to work with us and permit us to use of his materials. In addition, the Pueblo culture represents examples of most social science concepts. It also represents a culture which has felt the heavy impact of two other cultures and, therefore, provides a content center in which problems of cultural interaction can be studied.

To make the initial system, the following steps were planned:

1. Selection and modification of a category system.
2. Collection of data representing all possible aspects of the culture.
3. Organization of the data into the category system.
4. Development of visual (pictorial and graphic), auditory (audio tapes), and textual (written) modules for each category.
5. Development of orientation devices for introducing children to the system.
6. Trial of the data bank as a support system for children, with revision of the informational modules and orientation devices as a result.

Trying the System: Initial Studies

The second phase of activity was planned to investigate how children used the storage and retrieval system to answer their own questions and to solve a very general problem related to the Pueblo Culture. Particularly, investigations were designed to explore the kinds of questions the children would ask, their use of information, the parts of the systems they utilized, and the characteristics of the children which related to use of the system. In addition, extensive investigation was made of the types of help the children needed in order to make use of the data banks.

The design of the investigations is in Chapter Four and these particular studies are reported in Chapters Five and Six.

The Data Banks as Support Systems for Inductive Social Science Teaching

The studies to probe the potential usefulness of the data banks as support systems were conducted also to demonstrate the variety of possibilities for using the data banks as settings for research on social science education. The investigations were aimed at the following questions:

1. What kinds of cultural comparisons can children make when working with data banks representing two cultures? What are the characteristics of the students that affect search patterns? Information pertaining to this question is reported in Chapter Seven. In addition, the reported study probed the ability of groups to work on cultural-comparison problems.

2. Does a self-administering instructional unit which presents to the children a system for analyzing cultures affect the process by which they compare cultures? What are the characteristics of the children who respond to the instructional unit? Information pertaining to this question also is reported in Chapter Seven.

3. How does initiation by the student compare with initiation by the system in terms of the descriptions students make of cultures? Do themes and concepts used to describe the cultures vary as student control over inquiry increases? Information related to this question is reported in Chapter Eight.

4. Can students validate concepts drawn from the social sciences using information from the system? How does the complexity of the concepts affect the process of validation? A set of investigations related to this question is reported in Chapter Nine.

5. Can children generate solutions to social problems drawing on the data banks for information about the cultures? What kinds of solutions do they generate? Does practice in solving problems affect the problem-solving process? A small study relating to these questions is reported in Chapter Ten.

6. How does a simplified category system based on children's questions affect behavior by the children as they inquire into a culture? This question, an investigation of which is presented in Chapter Eleven, was designed as an initial investigation into the affect of the type of category system on the behavior of the student.

The above set of investigations is interpreted in terms of the potential of informational report systems for supporting inquiry by children. It is not the intent of this work to test or justify learner-initiated teaching methods as opposed to other approaches to teaching. The focus is rather on one of the technological aspects of an environment which would facilitate learner-centered teaching--the informational aspect of the environment. Hence the results are interpreted in the form of guidelines for the development of informational support systems and the possibilities for curriculum development in the social studies when informational support systems are created.

The Plan of the Report

In the next chapter related literature is reviewed and theoretical considerations are identified. In the Third Chapter the development of the data storage and retrieval systems and the preliminary tryouts are described. Chapter Four discusses sampling procedures, research designs, and logistical aspects of the work. Chapters Five through Twelve report specific investigations as indicated above. Chapters Thirteen and Fourteen interpret the results in terms of guidelines for the development of information systems for children and in terms of curriculum development possibilities when data banks for children are brought into the picture.

CHAPTER TWO

RELATED RESEARCH AND GENERAL CONSIDERATIONS

Except for technical reports deriving from attempts to build information systems for adults, the present effort derives entirely from curricular efforts in elementary social studies and from studies of children's conceptualizations of social phenomena.

Relation of the Problem to Social Studies Curriculum and Instruction

The contemporary effort to reorganize curriculums and instructional methods for young children has focussed on two main themes: the utilization of structures of academic disciplines as the organizing elements for subject matter, and the development of methods for helping children discover relationships for themselves (1) (Bruner, 1960). Neither of these themes has implied a necessary reorganization of the topics which form the focusses for most present curriculums; they have, rather, implied revision of the approaches to subject matter and the aspects of it which are emphasized. For example, if we accept Bruner's definition of structure as the way things are related by the scholar, and if we accept Schwab's (1961) contention that these relationships are and should be conceived of as fragile constructions of the mind, subject to change as information is gained or organized differently, then we would approach a topic in, say, physics, so that the student is helped to discover relationships among the information he learns, so that he analyzes the major relationships used by the scholar, and so that he learns that the relationships both he and the scholar find are highly tentative--hypothetical in nature, and he learns how to revise and expand these conceptions.

The application of these themes to instruction in the social studies implies that the major structural ideas used by social scientists be identified and developed in a form that can be introduced to children. It also implies that methods be developed which will help young children form ideas about the relationships among social behaviors--methods which will help them approach the analysis of social problems and topics in the social studies by developing, checking and revising hypotheses. The present work contributes to the development of these instructional methods in three ways; by developing data sources that will facilitate inductive learning, by providing research on children's exploratory behavior in the social science domain, and by developing a laboratory for research in children's social science learning.

Related Literature

Four general lines of inquiry are relevant to this study. One of these is made up of status studies of children's social concepts, including Meltzer (1925), Lacey (1932), Ordan (1945), Bates (1947), and Oakes (1947). Each of these studies indicated that children have great quantities of accurate and inaccurate ideas, are confused about many terms in common use in newspaper headlines and texts, that ability to manipulate concepts verbally increases with age, but that intra-grade variability is greater than inter-grade variability. Lacey concluded that clarity was related to school experiences and hypothesized that primary grade content is so thin that children cannot clarify many concepts until the intermediate grades.

The above investigations dealt chiefly with children's verbal associations with verbal symbols. Their chief significance for the present study is their demonstration that children are sufficiently variable and unclear verbally that guidelines for social education will probably not emerge from status studies of verbal attainment but are more likely to be found in studies of the ways children acquire and catalog information.

The second relevant thread of inquiry deals with the types of concepts attained and attainable by children. Many of the investigations have dealt largely with children's ability to infer causal relations among physical phenomena (Piaget, 1930; Deutsch, 1937; Huang, 1943). Piaget has argued that children are unable to develop adult-type concepts and are relatively concretistic in their thinking, being unable to manipulate the world verbally or make abstract assumptions until about the onset of adolescence. Hazlitt (1930) has argued that the differences between adults and children's thinking is more the product of experience than mental ability. Deutsch (1937) and others have found that children's causal errors are not so different from those of adults. Heidbreder (1948) found that individuals vary widely in their methods of attaining concepts, and that method varies with the perceptual situation. She also found the process of concept-formation in children similar to that of adults.

These investigations are difficult to interpret for social studies instructions. Their findings admonish us to develop careful hypotheses about the ability of children to form causal concepts essential to social education and to test these rigorously. The results need to indicate whether causal-directed inquiry can be carried on successfully in the elementary school with a reasonable proportion of children.

The third line of study has focussed on the nature of information-directed inquiry. Most of these scholars felt that the processes of inquiry are not dependent on content. "The principal difference between identifying a visually presented object as an 'apple' and a 19th century statesman as a 'Tory' lies not in the process of placement or identification but in the material and cues utilized." (Bruner, Goodnow, and Austin, 1956, p. 231).

Several of the authors cited (Ojemann, 1955, Anderson, 1944, and Lacey and Dallenbach, 1939), have attempted to investigate the effect of instruction on children's awareness of social cause. In general, their conclusions indicate that training has some effect. Lacey and Dallenbach even contend that the appearance of stages in causal thinking can be accelerated by training. Harvey, Hunt, and Schroder (1961) have developed a model of the nature and development of the "conceptual linkages between the individual and his world" that unites a theory of personality with a theory of conceptual styles and posits training environments which are likely to help or hinder individual development. The modes of inquiry by an individual and his state of concept development are inseparable. We cannot study concepts without studying the modes of thinking leading to them or which they inhibit or facilitate. Conceptual organization and style of inquiry are superordinate to the possession of information, but are not by any means unrelated to information.

By their model, progression along the abstractness-concreteness dimension assumes an increased availability of alternative concepts or schema for dealing with the same stimuli. Thus, as progressive development occurs, the person orders the world more relativistically and less stereotypically. He operates more in terms of multiple alternatives . . . rather than in terms of bifurcated black-white categories. (Harvey, Hunt and Schroder, 1961, p. 4.)

By this view, education should focus on the development of the individual's conceptual structure--"The person breaks down the environment into parts relevant to his current conceptual structure and then categorizes these parts in ways compatible with his organization. We draw an important distinction between the learning of concepts and learning as more traditionally defined, that is, in terms of how closely the performance of the person matches some prescribed external standard of the training agent" (p. 4). Development from concretistic to abstract styles occurs throughout childhood if conditions are optimal.

Bruner (1956) and his associates and collaborators have concentrated also on conceptual styles. Most pertinent here are their findings that individuals have different styles of attaining concepts using laboratory materials and that these styles can be described and conceptualized. The implication is strong that conceptual styles can be influenced by training.

The work of Suchman (1961) develops the idea of inquiry training. This unites the ideas that exploration, manipulation, and the quest for mastery are intrinsically motivating, and the belief that problems can be set through which children can develop more effective ways of thinking, and places these in a context which can be applied to classroom teaching. Suchman attempted to show that children approaching concrete problems in a responsive environment where the process of inquiry was guided would improve their powers of inquiry. He was able to train teachers in inquiry training and the children they taught showed increased fluency of questioning and shifts toward more analytical questioning. The present work begins one type of inquiry into the specification of children's conceptual styles in social science terms and should lead to research bearing on the teaching of conceptual strategies in the social studies curriculum area.

A fourth related line of inquiry has been the product of attempts to build social studies curricular materials for children. Senesh (1961) has been developing materials centered around the teaching of concepts from economics to elementary school children, testing the assumptions that these concepts can be learned by children. Writers for the Educational Development Center Social Studies Project (1965) make the assumption that the ways of inquiring of social scientists can be taught to children. In the area of science, the American Association for the Advancement of Science writing teams are proceeding and testing the assumption that the processes which scientists use can be successfully taught to the elementary school child. Price and others (1965) in their projects, make a similar assumption vis-a-vis the social sciences.

On the whole, the new materials have not been tested emphatically, but are subjected to "classroom tryouts." Some progress has been made in the exploratory work of Joyce and Weinberg (1964) and Joyce and Joyce (1965).

Joyce and Weinberg found that third and fifth grade children readily were able to find examples of social studies concepts during conversations about their primary groups. Joyce and Joyce found that teaching children to make inferences about values affected the questions the children asked about a previously unstudied society.

Joyce's (1965) analysis of social science education stressed a strategy for elementary school social studies which is made up of the following elements:

1. Depth studies in which children explore topics to the point where they obtain sufficient data to build and test concepts and inquiry styles of their own.

2. An emphasis on social science concepts as controllers of inquiry, as tentative representations of an elusive reality; hence, to be taught as emerging "windows on the world," rather than as the conclusions of inquiry.

3. An emphasis on the ways the scholar produces knowledge and checks ideas.

The development of a data storage and retrieval system as a setting for teaching capitalizes on the above work by:

1. Enabling exploration of learner-centered teaching strategies where the learner has immediate access to a much larger data supply than is ordinarily the case.

2. Enabling immediate observation of the uses the child makes of information he retrieves in solving a problem or pursuing a question.

3. Enabling relatively immediate observation of the effects which social science concepts and modes of inquiry have on the child's problem-solving behavior. In one study reported herein a specific investigation is made of this type of question.

The recent studies of political socialization (see, for example, Hess and Easton, 1962; Kohlberg, 1963; Strauss, 1952), moral development (Kohlberg, 1963), and conceptual development in children (Strauss, 1952) have so far indicated that the effects of schooling on the social thinking of children has been minimal. Social concepts seem to vary with age, social economic variables, and family characteristics, but the effects of instruction, if any, have yet to be identified. Social science educators are challenged to learn more about social conceptualization and how to increase the role of schooling in improving children's social thought. The current attempts to strengthen curriculum and instruction in the social studies are one type of response to this challenge. The work reported herein is a different but related response, for it should increase our ability to study children's social conceptualization and our ability to affect children's learning environment by providing informational support systems designed to facilitate their social inquiry.

CHAPTER THREE

DEVELOPMENT OF THE DATA BANKS: THE CREATION OF LA STELLA

The central activity of this project was the development of data storage and retrieval systems, based on exemplar cultures, which could support children's inquiry into social life. Two data banks were developed. One represented a Pueblo Indian Community and was based on a Pueblo located in the Southwestern United States. The second was based on a United States community representing the dominant form of European-United States culture. Four others have subsequently been begun, making a set of six representing different cultures.

The data bank representing the Pueblo community was developed first and illustrates the chief stages which were involved:

1. Selection of a category system to function as a base for storing and retrieving data.
2. Collection of data sources relating to the community.
3. Development of data units or modules containing data relevant to the categories in a form useable by children.
4. Informal tryouts of the system followed by revision of procedures and materials.
5. Development of self-administering system elements that orient children and teach them to handle components and audio-visual devices.

These stages were followed by the studies reported in the succeeding chapters.

Selection of the Category System

The essence of a retrieval system is the selection of documents from a store (Vickery, 1965). Most retrieval systems are created by studying the content and form of the documents and the needs of users, and generating an index that classifies the documents in terms that the user can relate to in light of his needs.

When we consider the development of informational support systems for educational purposes, we are confronted with the fact that the index system will very likely be an educational force in its own right. Classification is one way of structuring content, and an important way. As he uses a classification system, the student learns the underlying structure of the system, and the organizing concepts thereof can serve as the Bruneresque structure for his thinking about the field (Bruner, 1963).

In addition, we are faced with the problem, in the case of children, that we have very little research history with respect to their use of educational systems. Thus, we have very little basis for judging, in advance, what will be useful to them.

Hence, we made the decision to use a very broad category system, and one with a great many categories that provide storage of documents on a great many aspects of communities. We reasoned that this type of index should provide a reasonable good starting point, for it would enable students to retrieve information at many of the possible points for entering the study of a culture. Its chief disadvantage would probably be that it would be complex, and if it were desired to teach it directly to the students (and some uses would undoubtedly require knowledge of the index by the user) the task of instruction could be considerable. Put another way, a broad, intricate system helps the learner obtain exactly what he wants, and reduces the amount of unwanted information that is retrieved in response to a request. However, it may bring the most benefit to a sophisticated user who can comprehend the classification system and strategize its use.

At the suggestion of David E. Hunt, Professor of Psychology, Ontario Institute for the Study of Education,[1] we began with the Index to the Human Relations File. This index contains more than seven hundred categories covering most aspects of a culture. The index system is organized in terms of 88 major and 629 sub-categories. For example, the major category, "geography" is subdivided into seven sub-categories: location, climate, topography, soil, mineral resources, fauna, and flora. The general category, demography, is broken down into eight sub-categories: population, composition of a population, birth-statistics, morbidity, mortality, internal migration, immigration and emigration, and population policy. Under Interpersonal Relations we find social relationships and groups, friendships, cliques, visiting and hospitality, sodalities, etiquette, ethics, ingroup antagonisms, and brawls and riots.

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[1] Professor Hunt's colleagues at Princeton University had used materials from the area files as settings for social psychological research and for inductive social studies teaching. See: Carlin, et. al., 1967.

The first three general categories deal with introductory and methodological materials. The eighty-five remaining general categories are listed below.

Orientation
Bibliography
Methodology
Geography
Human Biology
Behavior Processes and Personality
Demography
History and Culture Change
Total Culture
Language
Communication
Records
Food Quest
Animal Husbandry
Agriculture
Food Processing
Food Consumption
Drink, Drugs, and Indulgence
Leather, Textiles, and Fabrics
Clothing
Adornment
Exploitative Activities
Processing of Basic Materials
Building and Construction
Structures
Equipment and Maintenance of Buildings
Settlements
Energy and Power
Chemical Industries
Capital Goods Industries
Machines
Tools and Appliances
Property
Exchange
Marketing
Finance
Labor
Business and Industrial Organization
Travel and Transportation
Land Transport
Water and Air Transport
Living Standards and Routines
Recreation
Fine Arts
Entertainment
Individuation and Mobility
Social Stratification
Interpersonal Relations
Marriage
Family
Kinship
Kin Groups
Community
Territorial Organization
State
Government Activities
Political Behavior
Law
Offenses and Sanctions
Justice
Armed Forces
Military Technology

War
Social Problems
Health and Welfare
Sickness
Death
Religious Beliefs
Religious Practices
Ecclesiastical Organization
Numbers and Measures
Exact Knowledge
Ideas about Nature and Man
Sex
Reproduction
Infancy and Childhood
Socialization
Education
Adolescence, Adulthood, and Old Age

The above categories, with their six hundred-odd sub-categories, became our preliminary classification system.

Collection of Data Sources Relating to the Community

The Pueblo community was selected as content for the first data bank because a great deal of information is available on it and other Pueblo communities, it is relatively easy to get to, and yet it is not a typical American community. It shows the influence of Indian, Spanish, and Northern European culture. The multi-cultural aspect made it attractive as source for the first bank because so many possible types of children's inquiry would be possible. Hence, the first investigations could explore more aspects of children's use. The atypicality of the community compared with most American towns was desirable because so few American Eastern children have more than superficial knowledge of Pueblo life, and therefore learning experiments could be designed so that we could determine what the children learned about the culture as a result of experience within the data system.

Having selected the Pueblo, we proceeded to identify sources of data concerning it. So many sources turned out to be available that we shall deal with most of them only generally.

1. Charles Lange, of the Anthropology department at Southern Illinois University, not only has written a comprehensive analysis (Lange, 1955) of the Pueblo, largely based on his original research. In addition to his published work, he led us to many other sources and permitted us the use of many of his pictures, taken during his years of field work.

2. A recent economic analysis of the Pueblo, prepared by a management consultant firm, leads to contemporary resources on nearly all aspects of contemporary economic and political life.

3. The Heye Foundation's Museum of the American Indian proved an excellent source of information about artifacts, pictures, and manuscript material.

4. The Smithsonian Institute proved to have manuscripts from anthropologists of the nineteenth century and in addition turned out to have a large collection of pictures taken in the nineteenth century by anthropologists and other observers. The pictures proved to be an exceptionally valuable resource, for they included many aspects of life before the time of great intersection with mainstream American culture.

5. Spanish records and books on the Spanish occupation proved to be numerous, but information about the Spanish era was abundant in some cultural areas and meager in others.

6. Frijoles Canyon in Bandolier National Park is a fertile source of archeological evidence about life in pre-Columbian times.

In addition to the above, hundreds of monographs, books, and pamphlets were consulted and numerous personnel from Mexican and government agencies, and the Pueblos themselves, provided documentary sources. We visited the Pueblos and made numerous pictures and made observations of life there.

Transformation and Classification of the Documents

The major portion of energy in the developmental effort was consumed transforming the material into a form which children can use and classifying the transformed material into the area file categories.

A serious problem appeared to be that material was available in vastly different quantities for various historical periods. The greatest documentation was available for pre-Columbian life (life in Frijoles Canyon), the period from about 1865-1895, when the nineteenth century archeologists were very active, the period around 1910, when further intensive work was undertaken, and the contemporary explorations from the late nineteen forties to the present. Between these periods documents were scant for many important life areas (although plentiful for others).

At length, we decided to attempt to provide documents for the area file categories in four periods of the Pueblo's life:

I. The pre-historic period, with evidence from archeology. This period was before the Spanish influence.

II. The period of the "early anthropologists" of the nineteenth century, after the Spanish influence but prior to much contact with English America.

III. The early twentieth century, when English-American influences can be discerned and the contact between the cultures was intensifying.

IV. The contemporary period.

This grouping would, hopefully, enable children to explore processes of cultural interchange and contemporary problems, but would keep the data bank from becoming impossibly complex. As it was, we were attempting to fill four "observation periods" for each of the six hundred-odd sub-categories of the area file, or more than twenty-four hundred categories altogether, as below:

	Human Relations File Category
Observation Period	11, 12, 13................829
I	
II	
III	
IV	

Since the system has been in a continuous state of revision, the number of categories for which documents were available has varied. At peak, over seventy percent of the categories contained at least one document.

Transforming Documents

The documentary evidence about pueblo life consisted of pictures, written material, graphs, charts, and maps. The material was culled, reworked, and classified into area file categories. The hundreds of pictures, for example, were classified. Written material was rewritten. Statistical data was placed in charts. Written passages were constructed to accompany pictures, charts, and maps. The process is most easily described through examples. The following are examples of material in the "Animal-Husbandry" category.

The material for this area is built around several pictures. The pictures are accompanied by written material to accompany each slide. The written text also served as script for a tape-recording which accompanied the pictures.

Picture Number	Script-Text
#2202	The Village of La Stella is in this land. There isn't very much rainfall here. The horses and cattle of the people who live in the villages have to go a long way to find grass to eat.
#2054	The Indians of the village of La Stella have fenced in their fields for their animals. The fencing in this picture is wire. When a field is fenced in, it is called a corral.
#2247	Here are some horses in a corral. They are grazing--eating the grass.
#2083	The children of La Stella love to ride on their ponies. Here is a little boy riding bareback at a ceremony near the village.
#2266	The horses of the village of La Stella are used many times for celebrations. Here a horse is being led onto the field. It will be a part of the show the people of the village are putting on.
#2360	Horses from the village are used for many other things. In this picture the horses are pulling the wagon to bring the hay back to the village.

Picture Number	Script-Text
#2345	Here one of the men who lives in La Stella is on his horse. He wears clothes like an American cowboy, and does work like a cowboy might do. He rides the ranges near the village to make sure the fences are in good shape. He also looks for stray cattle. The rope on his saddle is used to lasso calves and cattle when he is trying to bring them back to the corrals.
#2361	In the late afternoon, the young boys of the village bring back the tired horses to the corral. There is no hay in the wagon. The horses will be rubbed, watered and fed. They will rest up for another hard day in the fields.
#2344	In the evening one of the men of the village comes back from the range. He is leading another horse to the corral. Many of the corrals here in the village are made of long poles tied together.
#2222	Since he is tied up, this is probably one of the bulls that the people of La Stella own. The grass where he is grazing is very green. It probably has been irrigated--that is, watered with water from the river.
#2097	Here a horse and a cow are sharing the same pasture. The grass is not as green but there is a tree for shade.
#2319	The sheep are grazing on some very dry land. Sheep are able to get enough food in dry country where there isn't much grass.
#1047	This is the way the village of La Stella looked a hundred years ago. There is a burro and her colt in the picture. There were many burros in La Stella then, but there aren't any in the village today.

Picture Number	Script-Text
#1003	This turkey is in a pen in the village of La Stella. The people use his feathers for their Indian costumes. They will eat him when he is big enough.

The above material characterizes the approach most frequently taken. First, visual and non-visual material are related. Second, written passages are short, with each passage containing a very small amount of concrete information. Also, separate tape scripts were not prepared, but the written material was taped.

A second example is somewhat different. These eight entries are selected from about twenty on mortuary practices.

#7407

The Origin of Death

Shortly after leaving Shipap, the wonderful underworld from which all people come, one of the children became sick. The people did not know what the trouble was for they had never seen sickness before. They said to the chief of the Curing Society, "Perhaps our Mother in Shipap will help us. Go back and ask her to take away this new trouble."

When the chief arrived back at Shipap and gave her the message of the people, she said to him, "The child is dead. That is a good thing. If your people did not die, the world would fill up and there would be no place for you to live. When any of you die, you will come back to Shipap to live with me. Keep on traveling and do not be troubled when your people die. They are only returning to their Mother in the underworld." The chief returned to the people and told them what their Mother had said. From that day to this, the pueblo people did not fear death.

#3430

Funeral

(Observation Period 2)

When someone in the pueblo died, his or her family placed an ear of blue corn in a corner of the room where the person had died. The ear of corn stood for the soul of the dead person, which was still in the room. Alongside the ear of corn they put a small club, and then they scratched a circle of X's on the floor around the corn and the club. These marks looked like the tracks of the Road Runner bird. It was a magic circle to keep evil spirits away from the soul of the dead person. On the evening of the fourth day the three medicine men went there; one of them prayed, and another one took away the club and the ear of corn. The third man swept away the scratch marks with an eagle feather. When this was all done, the ceremony was over.

#2109 **Lonely Dirt Road**

(Observation Period 4)

Over the country-side near La Stella there are many lonely back roads. Sometimes there are graves along these roads. The graves are marked by crosses, and often have flowers on them.

#3620 **Priests**

(Observation Period 4)

Priests visited the pueblo. If the priest was there when someone died, he was given a Christian funeral. If the priest was not there when someone died, the Indians did not call him. The person was given an Indian burial.

#3436 **Mourning**

(Observation Period 3)

People whose close relatives had died did not take care of themselves. They did not wash their faces or comb their hair. They did not speak the name of the dead for about a year. Only those who had handled the dead body would bathe afterward.

#3440 **Burial**

(Observation Period 3)

If anyone died, he was carefully placed on his bed. His body was washed by his father's sisters, and then dressed in a new suit. One of the village medicine men came then with eagle feathers on his head, with his face painted, and with beads around his neck. He also wore turquoise earrings in his ears. He spoke to the dead man about where he was going, to another world, where the Indian race had begun, back to the first father and mother. Then the body was carried to the graveyard. Water and food were placed by the side of the body for travelling. After the burial the Indians believed the dead person ate for the last time--but only the smell of the food, not the food itself.

#3432 **Funeral**

(Observation Period 4)

When a person died, a woman, the mother, wife, sister, or daughter, washed the hair, and the family dressed the body in the person's best clothes.

A medicine man was called in to prepare the body for burial. He sprinkled herbs on the face and placed corn pollen in the mouth, but did not paint the face. He massaged the body, whispered some words, and pretended to take the soul out of the body. He placed a bowl containing pollen in the corner of the room and left it there for four days.

#3439 Funeral

(Observation Period 4)

Four days after a death, the medicine man returned to the home of the dead man or woman to get the bowl of pollen brushing the four walls with the pollen to get rid of any evil spirits that might have stayed.

#3431 Mourning (Page 1)

(Observation Period 1)

After someone was killed in the pueblo, the villagers mourned his death in special ways. They wailed for four days, because it took four days for the soul of the dead person to travel from this world to the world of the dead. The body was burned, and with it all the personal possessions of the dead person, his clothes, weapons, and tools. If it was a woman, her cooking utensils were broken and burned with her. The things that were burned with the person travelled with his soul to the world of the dead.

#3738 Life After Death

(Observation Period 1)

The Indians did not believe that they would be punished after death for anything they had done while alive. They did not have any fear of death. They believed that the soul was freed from the body after death, and went to a happy place where there was dancing and feasting. All went on in this place as it did in life. But there was no unhappiness there or pain.

#3740 Life After Death

(Observation Period 3)

The soul joined the Katsinas in the west after death. Four days after death the soul went on its journey to the Wenimats, the place in the west where good people went.

#3739 Life After Death

(Observation Period 2)

The Indians believe that those who died went to heaven above where God judged them. The bad ones went to hell forever but the good went to the Mother in the North, "Te-tsha-na" who was the source of the Indian race. God punished the good ones some before they went to their mother.

#3435 Burial

(Observation Period 4)

Babies born dead or any persons who were not baptized were buried under the floor near the doorway in the home. This was done by the father, not the medicine man.

#1055 Indian Funeral

(Observation Period 2)

The Indians of La Stella come out of the Church in a procession. The dead person is carried on a ladder. The man in white robes is the Catholic priest. Probably the dead person is going to be buried in the church burial fround, where some other graves are. The rest of the pueblo and the plaza can be seen in the background, also, a large, thatched ramada.

#2108 Road-side Grave

(Observation Period 4)

Along the roads near La Stella are quite a number of graves like these sitting all by themselves. The practice of covering the small cross with artificial flowers or with fresh flowers is very common in this area.

#3433 Burial

(Observation Period 4)

For burial the medicine man either sewed up the body in a blanket or he put it in a wooden box. The sacristan and his helpers dug the grave and made a cross of large pebbles on the bottom of the hole. The body was then carried on a ladder to the church where the sacristan prayed. Then the ladder with the body on it was put in a wagon and taken to the graveyard. It was put in the grave on top of the cross of stones with the head toward the west. On top of the mound, after the grave had been filled in, another cross of small rocks was formed. The sacristan said another prayer.

#3438 Mourning

(Observation Period 3)

The past either of the living or the dead was quickly forgotten. The people in La Stella cared about what was going on now in the village. The future did not interest the Indians either. They felt tomorrow would take care of itself, and therefore the pueblo life was lived in the "here and now."

#3434 Preparation for Burial

(Observation Period 3)

The medicine man went inside the house where someone had died and made everyone go outside while he whitewashed it entirely to clean it from sickness. The bad smell was washed away and the inside of the house was made clean again.

#2316 Grave

This is an Indian grave at the pueblo of San Ildefonso. It has been decorated with flowers.

#3437 Funeral

(Observation Period 1)

The people who lived in the pueblos were very careful when they buried someone. The grave of one man was found, the body lying in soft cotton, with his fire-making set beside him, and his bow and arrows for weapons in the other world. Some bodies were cremated, or burned, in pits dug in the valley. With the burnt bones were found pottery, stone vessels, carved shell jewelry, bone tools, and incense burners. The prople tried to bury clothes and tools with the dead person. They believed he would need them in the other world.

#3441 Mourning

(Observation Period 4)

When someone in the pueblo died, people who had been close to him did not make a show of their sorrow. They kept their feelings to themselves.

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The material in this section is stark with very little rewriting of the original sources. The fragments of available information have large gaps in them--hence, there is no smooth, complete narrative.

A third example is from the category, "legends." The legends came chiefly from the field notes of the early anthropologists and from Professor Lange's material. They were rewritten to make the language simpler and easier. The following are two examples:

Hummingbird Has Food

There came a time, long after they had left Shipap, when the people began to stop believing in our Mother. They said, "It is not our Mother who sends rain." When she heard this, she became very angry that they no longer believed in her. To teach them a lesson, she took in the clouds and put them away. There was no rain for four years. In that four years, the people did not even see a cloud. They began to wonder then, where our Mother had gone. They looked everywhere but could not find her.

There was only one living thing which our Mother wished to spare. That was the hummingbird. Our Mother had told the hummingbird, "Child, never tell where I have gone. For four years there will be no rain, not even a cloud. Whenever you are thirsty for honey, go to Shipap and there you shall suck from the flowers."

The people asked hummingbird many times where our Mother had gone, but each time she did not tell. The people began to die of thirst. The plants too died of thirst. The people tried with prayers and sacred songs to bring our Mother back, but she did not answer. The people were weak and there was nothing left to eat, but the hummingbird was still strong and fat. Finally the people gave up hope of finding our Mother. They knew now that it was our Mother who brought them rain and gave them food. They knew too that they had lost her because they had doubted.

Salt Woman Is Angered

The Indians were traveling south one day from the White House. Before they had left Shipap they had been told where to live and what to call their pueblos. So they came to La Stella, and others continued on and settled elsewhere.

One day Salt Woman and Salt Man came down to La Stella. They had been told by our Mother, "If the people do not receive you, you shall go on to the other villages." Salt Woman and Salt Man had been told to go into each of the houses to greet the people by shaking hands.

Because Salt Woman was old, gray-haired and covered with scabby skin, the people said, "We will not shake hands with her. She has sores all over her hands and face."

Salt Woman answered, "There are not sores on my hands and face. This was the way I was born." But nobody would shake hands with her, nor did they allow her into their pueblos. She said, "I had better leave this place and cross the river with Salt Man." In each village she came to, the people treated her in the same way. They would not shake her hands or allow her into their homes.

Finally, Salt Man said, "All right, we'll start again and live far from these people. Perhaps they do not want salt to flavor their foods." So they went down to Salt Lake.

Since that time men have always had a difficult time getting salt. They have to remove all their clothes and beads and go into the Lake very quietly. They must not speak a word or laugh or make fun or Salt Woman will again be angered. If they speak or laugh or make fun, they will stand just where they are and die. Because they had once angered Salt Woman, they will forever have a great deal of trouble to bring the salt.

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#7403 Kotcimanyako Scatters the Stars

A long time ago, after the flood, when everything began to live again the people came out from Shipap, the Underworld. Our Mother in Shipap told the different people that they were all brothers and there was no separation between them. As the people started on their trip to the south, a little girl named Kotcimanyako was left behind. Our Mother gave to Kotcimanyako a little bag made of handwoven cotton to carry on her back.

"Do not unwrap what is in this bag no matter what happens," said our Mother. The child promised she would keep the bag closed and off she started on the trip south. Again she was told, "Be careful, little daughter; do not unwrap what is in your bag." Again the child promised to do as she was told. She did not know what was in the bag she carried.

As she walked along, she began to wonder why she couldn't unwrap the bundle and why she was told not to even peek into it. The more she wondered, the more curious she became until she could not stand her curiosity another minute. Placing the bundle on the ground, she decided she must at least have a peek. As she undid the last knot, the contents of the bag spilled out onto the ground. Still she did not know what they were. She became frightened and quickly tried to put them back in the bundle when suddenly they all flew back into the sky and scattered all over the heaven. They were meant to have different names, and be put in special places, but now they were scattered everywhere. Those few which she was able to put back into her bag were given names and put in their right places. What Kotcimanyako carried in her bag were stars. The only ones which were named and put into their right places were the Sling Shot Stars, the Pot-rest Stars, the Shield Stars (Dipper), and a few others which Kotcimanyako managed to keep in the bag. All the rest are nameless and scattered over the heavens, never to find their very own special places.

- - -

This material is not accompanied by pictures. It is taped, so that children who need reading help can get it through listening. The entries in this section are simply the legends. The lack of interpretative material is deliberate--an attempt was made to prevent writers from getting between the data and the children when factual documents were being transformed.

There was one kind of information, however, where the writers deliberately used fictional techniques in an attempt to preserve authenticity of data. To illustrate history, certain political processes, and certain processes of socialization and family life, anecdotes were dramatized. The dramatizations were made as authentic as possible and were used to illustrate processes which were otherwise hard to convey. Only a few dramatizations were made, and these were done to experiment with the technique. As will be seen later, we came to believe that the technique, although not without its difficulties, has great promise for transmitting information about social processes. One illustration follows:

A Historical Dramatization

#7204

ACT I

Time: Coming of the Spanish to New Mexico
Place: La Stella
Characters: Cacique
Padre
Spanish leader
Spanish soldiers
Stellanos

SCENE I - The Plaza

Spanish Leader: What is the name of this village?
La Stellano (1): It is called La Stella.
Spanish Leader: We have come from a land across the sea.

#7204

We have traveled many days and nights. We are thirsty and tired. Can you give us food and water, and take care of our horses? They are tired, too.

La Stellano (2): You are welcome here.
Spanish Leader: Our men have come all this way for the gold. After we have rested a while, you can tell us where it is. Then we shall be on our way.
La Stellano (1): Gold? What is it that you call gold?

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Spanish Leader: You have another name for it. Here it is in this little sack. Pick it up and look at it closely. Then tell me where you have it hidden.
Las Stellanos (all): Um - ah - oh - etc. Very pretty. Nice.
Spanish Leader: Now you know what it is--I know you have some here. Where do you keep it? And where do you get it?
Las Stellanos: (all, much muttering, whispering).

4

La Stellano (2): We do not know what this is, this gold. It is very pretty, but we have never seen any before.

La Stellano (1): You are welcome to our food and water. You are welcome to all we have here. But we do not have any of this, this gold.

Spanish Soldiers: (Angry noises)

Spanish Leaders: Wait! Quiet, men! Be glad for the food and water. And to show our good faith, we shall leave in this village a padre (to the villagers).

5

We shall go now. Many thanks for your help. We shall leave here with you a priest of our religion. He will help you understand us and our ways. Most of all he will teach you about our God who is All-Powerful. We shall return some day. Farewell! (clatter of armor, hooves, etc.)

SCENE II - Later the same day; council room of La Stella.

6

Las Stellanos: (Muttering among themselves)

La Stellano (1): What is this religion they talk about? Who is this priest? We have our own religion, our own priests.

La Stellano (2): What do these people want? We gave them our food--Now they want more. And they will come back.

Cacique: I am an old man. And I am afraid for you, my people. These strangers bring trouble. Their priest is troublesome.

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La Stellano (1): This night we shall kill the Padre.

La Stellano (2): But there are many of them and they will be back.

Cacique: Yes, and they want what they call gold--our Seed of the Sun.

La Stellano (1): We are fortunate. The strangers did not know how we need our seed of the sun for our feast days. If they had looked in the kiva, they would have found it.

Cacique: No, when I saw the soldiers, I put it here

8

under my belt. It is safe for now. But we are no longer safe. We must go. And send the Padre away.

La Stellano (2): But where can we go? And we need time--the maize is not yet ripe in the fields. Our storerooms are nearly empty. And it will take the women many days to pack belongings from the houses.

Cacique: We shall not go far. Only to our old home

9

on the mesa. We must leave tonight. We shall come back at night to harvest the maize when it is ripe. You will tell the women to bring only the important things for living--their pots for cooking, the skins for warmth. You men will carry the food from the storerooms. We must hurry.

ACT II

SCENE I - The Mesa

10

La Stellano (1): (out of breath) I was hunting the deer on the side of the mesa near the village, and I saw them, the Spanish. They are in the village. There were many fires and many men. We are again in danger.

La Stellano (2): Gather all the men of the village together for a council. I shall tell the cacique.

SCENE II - The Council

Cacique: We are here now because

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we are afraid. Fear won't help us. Instead we must get ready for war.

La Stellano (1): And our sacred things? Our seed of the sun? Our turquoise and beads?

All: Bury them! Hide them! In the cave! In the trees! Under a large stone!

Cacique: Wait! In your hurry, you will be foolish. These men already are looking for a trick. They will look first in the caves and under the rocks. And the trees are not safe. No, I shall hide them myself tonight under the rito, our river. They will be safe there. I shall be the only one who knows where they are. No one will be able to make any of you talk if you are captured.

ACT III

Time: Two hundred years later
Place: La Stella

SCENE I - The Plaza

13

La Stellano (1): They are still looking for it, the gold. I heard some Mexicans in the village. They think we must know where it can be found in the mountains. And they know we buried our Seed of the Sun a long time ago.
La Stellano (2): Did they ask you to help them find it?
La Stellano (1): Yes--I told them I didn't know where it was hidden. That the cacique buried it that night and was killed the next day in a big fight with the Spanish.

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That no one knew where he had hidden it. But they wouldn't believe me. They are coming from Santa Fe this afternoon. They want me to be their guide.
La Stellano (2): I shall help you. Here's what you do. (whisper, whisper, chuckle, chuckle)

SCENE II - Later the same day.

La Stellano (1): Shh, here they come. Get the horses!
The Mexicans: Buenos Dias, mes amigos.

15

La Stellano (1): Buenos Dias. Juan is coming with us. He is getting the horses now.

SCENE III - The side of the mountain

Mexican (1): Are you sure this is the way?
La Stellano (2): Oh, yes, we've been by here many times.
Mexican (2): My horse is getting tired and I'm thirsty.
La Stellano (1): Be patient. Only a little way now.
Mexican (1): Couldn't we stop here for awhile? I'm getting hungry.

16

La Stellano (2): We'd better keep going while there's light. It's not much farther.
Mexican (2): There isn't much light left now. Can't we stop? What's the matter?
La Stellano (1): I've lost the trail! Juan, can you see it?
La Stellano (2): I can't see it right now. Let's go up the mountain on foot, leading the horses. (To the Mexicans) You two stay here a little while and rest. We'll find the trail and come

17

and get you.
Mexican (1): Well, I'm glad they're gone. Now if we find the gold it will be ours. We won't have to share it with them.
Mexican (2): Yes, but how are we going to find it in the dark? I'm cold. I want to go back!
Mexican (1): On that trail? Are you out of your mind? Come on. I saw a cave up here a little way. I think I can find it in the dark. We'll look for the gold. At least it's a place to spend the night.

18

Mexican (2): All right. Not so fast. I'm coming. I'm coming.
Mexican (1): Eeyah! Did you see it? Wait here and be quiet. There it goes again--the light and the noises.
Mexican (2): It's just the birds and bats that live inside the cave.
Mexican (1): But the light! And they aren't mortal birds and bats. The place is enchanted. We can go no further. We'd better stop here and pray.

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Mexican (2): Where are those Indians?
Mexican (1): Be still and say your prayers.

SCENE IV - The next day; the plaza

La Stellano (1): Well, did it work?
La Stellano (2): Like a charm. They came staggering down the mountain this morning, stiff from the cold, and full of tales about an enchanted cave.
La Stellano (1): An enchanted cave?
La Stellano (2): Yes--the one where the Indian spirits guard the gold. It is filled with light and dreadful noises.

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La Stellano (1): Ha, Ha! It was probably their empty stomachs playing tricks on them.
La Stellano (2): That, or the gold fever. I don't think they'll bother us anymore. Do you think La Stella ever had much gold?
La Stellano (1): No, not I. Sometimes the old men speak of it, but I do not believe them.

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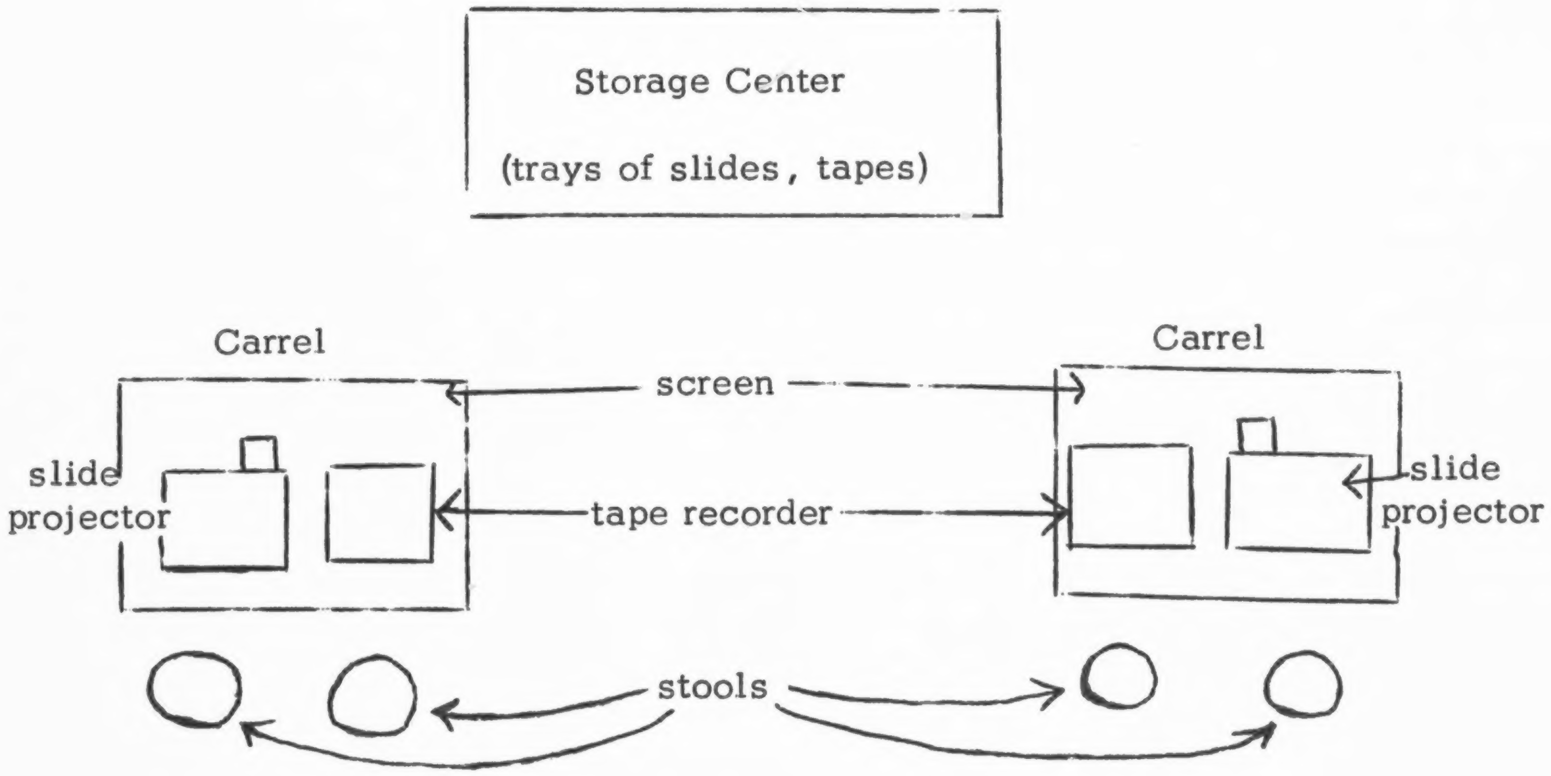
All told, the written material, pictures, charts, and maps added up to more than 2000 pages of documentation related to the Pueblo town.

Production of Slides and Tapes

At this point the entire mass of material was photographed and reduced to 35 millimeter slides. All written material for each area file was then tape-recorded so that youngsters who could not read the material effectively could listen to it. The slides were placed in storage trays, and the tapes were numbered consecutively and placed nearby.

Large maps of the Pueblo, displays of pictures and artifacts, and posters were prepared. Carrels were built to hold tape recorders, slide projectors, a small projection screen, a small map and room to write. The environment thus created can be mapped thus:


Storage Center
(trays of slides, tapes)
Carrel
Carrel
screen
slide projector
tape recorder
slide projector
stools

Preliminary Tryouts

During production, the material was read by children so we could determine whether it had reasonable readability. The intention was to make a system that could be used comfortably by most fourth grade children (approximately nine years old).

To ensure this, we conducted the preliminary trials with seven and eight year old children drawn from second grades in the Center School of Wilton, Connecticut.[1] In the Spring of 1967 thirty children were introduced to the information system in the following manner:

1. The system was set up in a corner of the library.
2. Each child was shown the elements of the system.
3. Through a slide talk he was introduced to the Pueblo and how to withdraw information about the Pueblo from the data bank.

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[1] We owe thanks to:

4. To stimulate inquiry, the student was presented with two tasks, "Learn about the Pueblo until you feel you are ready to teach another child about it," and "See if you can learn enough about the town to figure out what kind of business would do well there."

5. To get information, he simply asked a question. The question was translated by an adult attendant into an area file category.

   He took the number of the category to the storage center, where he located and retrieved slides and tape and carried them to his carrel.

   In the carrel, he showed himself the slides and listened to the tapes, seeking the answer to his question. When finished, he returned the material and asked another question, beginning the cycle again as his new question was translated into an area file category.

6. Each individual student was permitted to ask questions for several hours (working one hour at a time) and then asked to make a tape recording describing the Pueblo . He was also interviewed to obtain impressions about what he had learned, difficulties he had working with the system, his understanding of the task, and other procedures.

Results of the Preliminary Tryouts

The preliminary tryouts were informal, with no rigorous experimental design, but the following results appeared to be clear, and revisions were based on several of them.

1. First, the seven-year-old children were able to use the system. They asked questions, retrieved information, appeared relaxed and happy as they used tapes and slides, and made lengthy tapes describing what they had learned to a mythical child. Nearly all of them asked for the tapes they had made and took them home to play for their families. Only two children had difficulty with reading or were overtly uncomfortable using the system. Most of the children kept asking questions and retrieving

information until gently asked to desist. It must be noted that these were the children of affluent, middle-class families. For the most part these students were verbally able and confident in their environment.

2. Second, it appeared that the influence of adult attendants was very great. For example, if a research assistant began to give overt signs of approval of specific behavior by a child, he would tend to orient himself to the assistant, looking for instructions, approval of his questions, and solutions to his problems. If the assistant was friendly but businesslike and permitted the students to try to work out their own problems, the children tended to go about their own business independently. It seemed wise to develop self-administering units which could orient the students to the data banks and present the tasks and ideas to them so that the assistants' contact with the children was oriented toward the giving of needed help. Also the children, provided with self-administering orientation, presentational, and instructional units, became more fully into control. As this was accomplished, the children seemed to respond to the increased amount of control they were able to achieve, and the influence of the adults appeared to diminish, although it became a factor in the subsequent studies and in the procedures which were developed. (See Chapter Five).

3. As simple as the tasks were, there seemed to be great differences in the effect they had on the children. The "free inquiry" task ("learn until you can teach") seemed to stimulate greater questioning and general activity than did the "business" task. However, some children seemed more stimulated by the "business" task. We began to realize that this setting could be used to investigate the effects of different kinds of teaching tasks on learner activity and the responses of different learners to differing environmental conditions.

4. One finding appeared that was to persist over the studies. Although the students could have general help with reading, they preferred specific help (what is that word?) or none at all. Our elaborate provisions for the non-reader were

> never used as we had hoped. Confronted with the printed word, our students struggled with the process of reading, even when the struggle was difficult. (Chapter Twelve includes the results of analyzing requests for help, use of the tapes, etc.)

After the tryouts, the self-administering orientation units and task-presentation units were refined and remained the mode for the remainder of the developmental work. This greatly helped to standardize the procedures, but the role of the adult attendant was not eliminated, and his importance to the students was apparent throughout.

Also, some material was rewritten and mechanical procedures were modified. The basic system was kept in the resulting form through the studies that are reported in the following chapters.

The same developmental sequence was followed to build the "Prestonport" bank, based on an American town. The two banks formed the laboratory for the studies which follow.

CHAPTER FOUR

THE DESIGN OF THE RESEARCH: GENERAL CONSIDERATIONS

Once the first data bank (La Stella) was completed and it appeared that children as young as six and seven were able to use it and enjoy doing so, the first investigations of use were made. As soon as the second data bank (on a more typical American town) was completed, studies were added which involved cultural comparison.

It will be recalled that there were several general purposes for doing the research. The first was to obtain information about children's use of information systems--to find out what kinds of questions they would ask and how they would use information drawn from the data banks. Second was the attempt to investigate factors which affect use of the systems and to begin to manipulate variables so that guidelines for the development of information systems could be developed. In addition, the research was designed to explore the possibilities of the information-retrieval laboratory as a setting for research into the social science education of children and as a setting for teaching concepts and modes of inquiry drawn from the social sciences.

A variety of uses of the data bank setting was explored. Some investigations looked at children's use of the data banks when almost no constraints were employed. Others examined their behavior when they were presented with cultural problems to be solved and social science concepts to be validated. Still others focussed on their responses when asked to compare cultures using the data banks as sources of information. Another explored the effects of problem-solving practice on problem-solving behavior.

The students who were the subjects of the studies were drawn from the Broad River School in Norwalk, Connecticut, and the Miller School in Wilton, Connecticut. The Broad River School was the setting for research employing stratified samples of children, with socio-economic factors and academic factors being the definers of the strata. The Wilton, Connecticut schools cooperated for in-depth studies involving small samples of children where matched groups of able middle-class children were studied in investigations where demographic variables were not important, but where changes in experimental conditions received the focus.

On the whole, experimental controls were employed. In most of the studies, matched pairs of students were randomly assigned to treatment groups conducted under standard conditions with only one variable being manipulated in each study.

The data are quantitative and descriptive, with concentration focussed, for the most part, on two types of variables. One is the process by which students receive Input from the system. Input refers to the questions they ask, the number of questions, the content of the questions, the patterns of questioning, the apparent relatedness to the tasks at hand. The other is student Output as they complete tasks in the data bank setting. For the most part output was collected in the form of tape recordings made in response to task directions. For example, in the "Business" task, students made tape recordings stating the kinds of businesses that they selected and made supporting statements. The recordings were analyzed chiefly in terms of themes or the lines of reasoning which were generated. Focus was on the number of themes, the content of the themes, their conceptual level, or abstractness, and relatedness to the problems or tasks concerned. The specific input and output measures varied from study to study, but attention to them is present throughout the project.

In most of the investigations, students worked alone or in small groups, although the data banks are suitable for large group inquiry and certain kinds of mass teaching. In this initial set of investigations, however, it was desired to learn as much as possible about the specific processes of inquiry by individual students because the design of instructional systems utilizing information systems seemed best served by that strategy. As will be seen, when students worked in groups the process of inquiry by individuals was obscured and the important questions became ones of group process.

The entire research program consists of eight investigations, several of which have sub-sections or contain subordinate studies.

The First Study: The Free Inquiry Task

Over one hundred second, fourth, and sixth grade students participated in this study which consisted of individual administration of the "free inquiry" task ("Learn about the culture until you feel ready to teach another child about it.") The study explored the number and kinds of questions asked, relation between input and output measures, and grade, achievement, intelligence, socio-economic status, and reading ability as variables influencing performance.

An important outcome was the finding that nearly all the children's questions could be translated into area file categories--a finding that persisted throughout the investigations and was undoubtedly due to the comprehensiveness of the Human Relations Area File Index. In many ways the most interesting data resulted from classifying the content of the questions, providing a graphic description of the kinds of questions children ask when inquiring into a culture.

The Second Study: The Business Task

Students participating in this study were ninety sixth, fourth, and third grade students, again a stratified sample. In addition, the fourth and sixth grade students were matched with their counterparts from the Free Inquiry Study, enabling comparison of performance under the two task conditions. The same questions were explored as in the Free Inquiry task, with the additional questions of comparison and the examination of the relatedness of input and output to the more specific conditions of the task.

The Third Study: Groups in Action

The students participating in this study had completed the free inquiry task. They worked in groups selected to enable us to observe what happened when various combinations of students were grouped together. (As when "high searchers" were grouped together or mixed with "low searchers.") In addition, the task was a "cultural comparison" task, involving the use of two data banks (the Pueblo and the "typical" American town), enabling the examination of Input and Output variables when cultural comparison was asked.

In this study, also, a self-administering system (the "Question Stimulation") was tried out which presented to the students a set of questions for studying cultures and, with the groups matched, the effects of the question stimulator were observed in terms of Input and Output behavior by the groups of students.

The Fourth Study: Student Inquiry vs. System Initiation

The fourth study was designed to begin what we hope will be a long series of investigations into the dimensions of pupil and system control within curricular systems utilizing information sources of the kind we have developed. In this study the matched pairs of students were "yoked" in a design suggested to us by David E. Hunt of the Ontario Institute for Studies in Education. One group of students inquired under free inquiry task conditions and their matches received the input that the free inquirers generated. The output for both groups was compared. This investigation not only deals with the controversial area of "inquiry" and "expository" methods in education; but, more important, it begins investigations which should yield us knowledge about the kinds of outcomes which are affected by learner and systems control so that we can begin to search for optimal combinations with respect to various kinds of educational goals.

The Fifth Study: Validation of Social Science Concepts

One of the most important potential uses of the data storage and retrieval systems is as a setting for the teaching of the modes of inquiry and the concepts of the social sciences. The fifth study again began what we hope will be another long series of investigations which should begin to provide us with a kind of "map" of the types of social science concepts that the children of various ages and characteristics are able to deal with. Ten social science concepts were identified and organized according to a criterion of "complexity," which refers to the approximate number of factors involved in the concept, and the number of inferences that it is necessary to make in order to deal with the concept. The ten concepts were then presented to students who were asked to find out whether the concepts held true in the two cultures represented by the data banks. The students then made tape recordings--side two-- of their answers, and they were interviewed to determine the evidence that they could cite for the answers that they gave. Third and fifth grade students from the middle class school engaged in the study.

The Sixth Study: Solving Social Problems

One of the serious questions in the development of a social studies curriculum system is the extent to which children are able to intellectualize and strategize social problems. An equally interesting question is whether or not we are able to affect the kinds of solutions that children will generate as they attempt to come to grips with social problems and, particularly, whether we are able to develop self-administering systems. In the sixth study, both of these questions were approached. A group of children were presented with social problems drawn from the Prestonport town. Half of the students then studied the Pueblo culture under free inquiry conditions, while the other half engaged in a further solution of cultural problems drawn from the pueblo culture. Both groups of children then were presented with problems drawn from the Prestonport culture and two questions were explored. One was whether the treatment, that is simply exposing children to the task of solving cultural problems, had any effect on the types of solutions they generated. Second, an analysis was made of whether the children in both groups were able to approach and strategize solutions to the different types of cultural problems represented by our choice.

The Seventh Study: Reorganizing the Category System

One of the important questions in the development of an information system is the selection of the category system. This is another area which will obviously require a great number of investigations before one can come with any concept of "optimality." In the seventh investigation two treatment groups entered the system under the free inquiry condition. One of the groups utilized the large category system, which was constructed logically to make comparative studies in anthropology a reality. The second group entered a much shortened category system, only about 35 categories compared with over 600 for the original system. Moreover, the shorter number of categories were based on an analysis of the most frequently-asked questions by children in the prior studies. Hence, the investigation looked not only at a short category system, but one which was developed specifically to yield to the questioning patterns of children. Output was a particular focus of the study as we sought to explore whether the description of the culture varied significantly with the change in category system.

The Eighth Study: Help Needed by the Children

Embedded in all the other studies was a continuous pattern of data collections designed to determine the kinds of help children needed as they completed each task and whether the tape recordings which had been designed to overcome reading difficulties functioned effectively. Each time a research assistant helped a youngster in any way, he filled out a form called the "aid given form" in which he noted the kind of help he gave and whether he or the student had initiated the contact. Use of the tape, was recorded also, under all the task conditions.

These data were tabulated for all of the studies and were examined especially closely when engineering changes were made in the system, as in the case of the seventh study when a new category system was employed. The results begin the development of a base of knowledge from which we can begin to construct support systems within the data bank to provide the help that children actually need.

The Ninth Study: Children's Preference for Task Structure

This investigation was designed after the pilot study in which it was determined that some students appeared to prefer the looser structure of the free inquiry task to the somewhat more directional structure of the business task and other similar tasks.

The study used a counterbalanced design in which matched groups of children engaged first in one task, and then the other, in an effort to determine whether the change in task affected performance. This design was seriously flawed in that the experience in one of the tasks seriously affected their behavior in the second task, and the measures we employed could not separate the two. Fortunately, however, the results give some very clear indications about how an investigation of this important kind of factor can be carried on, thus opening up a set of investigations into what might be called "teaching style" and "learning style."

The Total Design Package

It can be seen that all of the studies utilized a fairly limited method for collecting data which resulted in quantifiable measures of what we defined as "input" and "output". Otherwise the studies can be seen to fall into a number of categories when one takes the long view of curriculum development in the social studies. In the first case, some of them begin to lay a general empirical base of what children are like as question-askers and describers of culture under different types of task conditions. The free inquiry task, the problem-solving tasks, the concepts validation tasks, the business task, the cross-cultural task and so on, when the results are taken together, begin to give us some idea of the kinds of questions children ask when they study cultures and the kinds of items they select when they are asked to make descriptions of the cultures they have been studying. Second, the pattern of studies begin to probe into the questions of teaching the concepts and modes of inquiry of the social sciences when extensive information systems are available to the children. Particularly, the problem-solving studies, the studies of concept validation, and the studies in the use of the question-stimulator, all begin to give us some idea of children's ability to approach problems, to approach concepts, and to respond when tasks or instruction lead them into more sophisticated analyses than they ordinarily engage in by themselves. The third category is what we might call purely engineering studies. They deal with questions like: What is the effect of the task structure? What is the effect of a change in the category system? What is the effect of self-administering units which present problems to students? What is the effect of a program which asks students to solve cultural problems? What kinds of help do students need? What kinds of assistance do they need to have with reading? How long do they search and under what conditions?

Because this was a developmental effort and the investigations were the first conducted in the particular kinds of setting utilized here, it is the third category of studies (the engineering studies) which are actually the most complete. They provide, even at this stage, with guidelines for the development of primitive data banks for children. The other investigations, while they begin to give us some idea of children's modes of questioning and of ways of effecting these by teaching them the modes of the social scientist, are a very early stage of investigation, and must be followed up before we will have firm knowledge on those important questions.

Although the reader will have to judge for himself the meaning of the patterns of the investigations and the utility of the results which we obtained, we should probably express our bias here. That is, it will take a great many empirical investigations to lay any kind of scientific base on which curriculum development in the social studies can proceed rationally. However, the data banks affected the behavior of the children far more significantly than we had anticipated. We knew that there had to be some effect on the children of providing them with such comprehensive information sources. However, we had no idea that the effect would be as significant, or that we would learn so much from this initial series of studies. While the total effort is modest, the impact on us as investigators and developers of social studies curriculums has been substantial.

CHAPTER FIVE

THE FIRST STUDY: THE FREE INQUIRY TASK

The initial study was designed to find out what children would do with the data bank under very unstructured conditions. The gross questions to be explored were: Can children use the data banks to explore a culture? What kinds of questions do they ask about the culture when they are free to structure this inquiry, e.g., have not been given instructional tasks, problems to solve, and are not subject to evaluation? After they inquire into a culture, how do they describe it? Do age, reading ability, intelligence, and socio-economic background affect the input and output variables (the withdrawal of information and the description of the cultures)?

The Sample

Ninety children, working as individuals, participated in the study. The ninety came equally from the second, fourth, and sixth grade of the Broad River School in Norwalk, Connecticut, Robert Bottomley, Principal. They represented a wide range of intelligence and social backgrounds. The children were selected for the study in the following way. All the children of each grade were divided into pairs matched by intelligence and the socio-economic status of their parents. Thirty pairs were chosen randomly from all the pairs. Then, the members of each pair were randomly assigned as participants for the "free inquiry" study and the second study, the "business" task.

Procedures

The same procedures were followed for each of the ninety participants. Each was met by a research assistant who introduced herself and provided the student with the self-administering orientation unit. After helping him thread his tape recorder and start his slide projector, she observed while he administered the orientation unit to himself, helping him where necessary and recording any help given. (The "Aid-Given" form, used for recording assistance rendered to each student, appears in Appendix A.) Data related to help given is reported in Chapter Twelve, as is an analysis of the types of problems which children encountered in using the data banks.

Following the orientation, each participant was presented with a tape recording which oriented him to the "free inquiry" task. (In essence: "Learn about this place and these people until you feel ready to teach a classmate about it and them.") This tape is referred to as the Free Inquiry Control Unit.

After the presentation of the task, the students proceeded to ask questions about the Pueblo. After each question, the research assistant translated the question into an area file category, recording the question and the area file number on a three-by-five card. The student took the card to the storage center and retrieved the slides and tapes related to that area file category. Returning to his carrel, he showed himself the slides and, if he wished, listened to the tapes. After looking at or reading each slide, he noted on the "Slide-Sorting Form" (see Appendix A) whether the slide "told me a lot, a little, or not very much" by writing the number of the slide on the form.

After completing his examination of the material, the student would return the slides and tapes to the research assistant, ask another question, and the above-described process would be repeated. The students worked in this fashion for about an hour each day. They returned on subsequent days until the search was completed. The research assistants were on hand to offer assistance, and each request for assistance was recorded on the "Aid-Given" forms.

When the student signified that he was "ready" to teach another child about the Pueblo, he was provided with a blank tape and he made a recording in which he described the Pueblo. As described in Chapter Four, this recording was analyzed and the product of the analysis is referred to as the "output" from the task.

During the pilot studies of the "free inquiry" task, it was discovered that most of the children would amiably continue to ask questions for a very long period of time. To complete the planned series of investigations in a reasonable number of months, procedures were instituted that reduced the amount of inquiry while still permitting it to go on long enough for variability among individuals to appear. The "dampening" procedures were as follows: Each student's questions were recorded on file cards. At the beginning of each session, the directions for the task and his questions were reviewed with him and he was given the slides he was using to give him information relative to the question he was working on. This small amount of attention was sufficient to reduce the amount of inquiry to the point where studies could be done in a manageable time period. To put it mildly, we were impressed by the extent to which "teacher attention" had a dampening effect on children's questioning behavior. The deliberate shortening of inquiry certainly reduced variability among students and affected our findings. The benefit, however, was the increase in the number and variety of investigations which could be completed, with a corresponding rise in the variables we were able to investigate.

The Results of the Free Inquiry Task

The results are presented in terms of input and output variables and the relations among them.

The Content of the Questions

The first test of the usefulness of the Area File Category System was the "fit" of its categories to the kinds of questions the children asked. We had already established in the pilot studies that attendants could easily be trained to a high degree of agreement in translating children's questions into area file categories. We now learned that nearly all children's questions appeared to fit one or more area file categories. In fact, all of the first 800 questions asked by the children were translated into what seemed to us to be a reasonable area file category.

While this finding augurs well for the use of this type of category system, it does not answer all questions about its usefulness. For example, there were many areas which the students did not explore at all. More wide-ranging inquiry might have strained the capacity of the index system. Also, a system which is less discrete, which provides more information which is not as relevant to the questions, might actually stimulate the students to wider-ranging activity. It is possible that the best criteria for a good educational category system are not relatability of documents and inquiries, as is the case in systems for business and scholarly use. (In Chapter Eleven a study is reported which explores the effects of using a category system based on children's questions.)

In Table One there appears a list of the first 400 children's questions in terms of frequencies of the area file categories. These 438 questions fitted into 238 area file sub-categories. (The sub-categories have been grouped together to make the table manageable.)

TABLE ONE

CLASSIFICATION OF 400 QUESTIONS BY AREA FILE CATEGORIES

Area	Frequency
Geography, Topography, and Climate	25
Housing and Buildings	50
Transport	27
Games and Recreation	31
Clothing and Costume	38
Food and Water	47
Handicrafts	22
History	21
Tools and Equipment	19
Schools and Education	18
Work and Livelihood	16
Religion	14
Dances	13
Warfare	12
Holidays and Ceremonies	9
Other	38
	400

About three-fourths of the questions dealt with relatively "tangible" aspects of culture--buildings, clothing, etc., with the other pertaining to less tangible aspects.

In order to permit a comparison of the content of questions asked by the children of the three grades, a tabulation of the questions was made in terms of the area file categories which they represented. In Table Two the frequencies of the sub-categories are tabulated by grade.

TABLE TWO

FREQUENCY OF CATEGORIES SEARCHED IN THE FREE INQUIRY TASK BY EACH GRADE

Category Name	Grade 6	Grade 4	Grade 2
13. Geography	20	13	9
14. Human biology	1		
15. Behavior processes and personality		1	1
16. Demography	6	3	1
17. History and culture change	12	2	2
18. Total culture			
19. Language	5		1
20. Communication	3	4	
21. Records			
22. Food quest	3	3	4
23. Animal husbandry	10	4	1
24. Agriculture	14	1	
25. Food processing	2	4	
26. Food consumption	26	14	9
27. Drink, drugs, and indulgence	2	5	
28. Leather, textiles, and fabrics	3	6	
29. Clothing	36	20	20
30. Adornment	2	4	1
31. Exploitative activities	2	5	1
32. Processing of basic materials	8	9	4
33. Building and construction	12	10	4
34. Structures	14	10	5
35. Equipment and maintenance of buildings	9	7	3
36. Settlements	7	4	
37. Energy and power	2	3	2
38. Chemical industries			
39. Capital goods industries			
40. Machines	3	4	
41. Tools and appliances	10	7	2
42. Property			
43. Exchange	13	5	1
44. Marketing			
45. Finance			
46. Labor	11	3	
47. Business and industrial organizations	2		

TABLE TWO (con't)

Category Name	Grade 6	Grade 4	Grade 2
48. Travel and transportation	15	12	1
49. Land transport	6	3	1
50. Water and air transport			
51. Living standard and routines	4	6	3
52. Recreation	31	13	3
53. Fine arts	14	9	1
54. Entertainment	5	1	1
55. Individuation and mobility			
56. Social stratification			
57. Interpersonal relations	1		
58. Marriage	4	1	
59. Family		1	1
60. Kinship			
61. Kin groups			
62. Community	8	1	
63. Territorial organization			
64. State			
65. Government activities	3		1
66. Political behavior			
67. Law	1		
68. Offenses and sanctions	1	1	
69. Justice	1	1	
70. Armed forces			
71. Military technology			
72. War	4		1
73. Social problems			
74. Health and welfare		1	
75. Sickness	4	2	
76. Death	2		
77. Religious beliefs	17	1	
78. Religious practices	11	2	
79. Ecclesiastical organization	4		
80. Numbers and measures			
81. Exact knowledge			
82. Ideas about nature and man			
83. Sex			
84. Reproduction		1	
85. Infancy and childhood	7	4	

TABLE TWO (con't)

Category Name	Grade 6	Grade 4	Grade 2
86. Socialization	2	1	
87. Education	20	9	1
88. Adolescence, adulthood and old age	1		
Totals	402	221	85

The similarities and differences are interesting. Clothing, housing, and geography, among others, were popular among the students of all grades. The range of categories increases by grade, however, and generally extends into the less tangible aspects of culture. Such categories as social status, personality, and the economic base of the community were not explored at all, however.

It appears that the very broad category system was useful in "holding" the questions of the older students. Grade differences were probably accentuated by the increased frequency of questions, especially between grade two and the other grades. We will look several times again at grade trends during the report.

The Frequency of Questions and Categories

In Table Three there are presented the mean number of questions asked by the second, fourth, and sixth grade students during the Free Inquiry Task.

TABLE THREE

MEAN NUMBER OF QUESTIONS ASKED BY SECOND, FOURTH, AND SIXTH GRADE STUDENTS IN THE FREE INQUIRY TASK

	Grade 2		Grade 4		Grade 6
Mean	2.570		8.209		8.762
SD	2.14		2.891		3.106
Difference between Means of Adjoining Grades		6.639		0.553	
t value of difference		9.14 (.001)		.774 (.441)	

The means for grades four and six were close--the difference did not approach significance. However, the grade two mean was much less. In fact, the average frequency was so low that we doubt that more than a half dozen of the second grade children were using the system effectively. Because of this, third graders were included in the business task which is reported in the next chapter in an effort to find out whether they would be able to use the system more efficiently.

It is worth noting that the second grade results here are very different from those which were obtained from the second graders in the middle class Wilton, Connecticut schools during the pilot study. The Broad River School is used for this study because of the wide range of socio-economic backgrounds which enabled the testing of the system with youngsters of a considerable range of backgrounds. Since the middle class second graders had been able to use the system so effectively and the children representing the school with a wider range of socio-economic backgrounds had great difficulty at the second grade level but not at the later levels, we need to look at socio-economic variables as they affect performance in the system. In Table Four there are presented the coefficients of correlation between parents' occupational levels and numbers of questions asked for grades two, four, and six.

TABLE FOUR

CORRELATIONS BETWEEN PARENTS' OCCUPATIONAL LEVELS AND QUESTIONS ASKED DURING FREE INQUIRY BY GRADE

Coefficients of Correlation

Grade 2	Grade 4	Grade 6
.384*	-.202	.382*

* $p < .05$

The correlations are positive for grades two and six and there is no significant correlation for grade four, although the coefficient is negative. It appears that we have to consider that socio-economic status was a definite factor with respect to the frequency of questions asked. We will look at this question of social status and use of the data storage and retrieval system again with respect to each of the subsequent studies for which there was a wide enough range of social status to make it meaningful. Also, we will look at the question of social status variables and the output variable a little further along in our report on the Free Inquiry Task.

In Table Five the means and standard deviations for the three grades are compared and the t value of the differences between adjoining grades is presented as well.

TABLE FIVE

CATEGORIES SEARCHED BY GRADE DURING THE FREE INQUIRY TASK

	Grade 2		Grade 4		Grade 6
N	30		43		35
Mean	3.30		10.74		14.00
SD	2.18		4.59		5.06
Difference between Adjoining Means		7.44		3.26	
t value of differences (significance)		9.952 (.001)		2.931 (.004)	

There were large and statistically significant differences between the grades with respect to the categories searched. The differences are perhaps even more meaningful when we make ratios between the average numbers of questions asked in relation to the numbers of categories to which they pertained for the three grades. For the sixth grade the ratio was 1.61, that is, the sixth graders' average question pertained to over one and one half categories. For the fourth grade the ratio was 1.3, whereas for the second grade, the ratio was 1.28. The differences represent breadth in questions. Particularly, between the fourth and sixth grades, there was a large difference in the breadth of questions in favor of the sixth graders.

These findings are really not unexpected in any way. Apparently the fourth and sixth graders were well able to use the system, and middle class second graders appear able to use it also. Social status appears to be a variable and between the fourth and sixth grades breadth of questions asked appears also to be substantial. This breadth of questions is reflected in the broader content of the questions as presented in Table Two. Particularly, the sixth graders appear to probe more into the intangible areas of the culture.

The patterns of questions of the questions asked is also of interest. A detailed analysis of the patterns is beyond the scope of a report such as this one, but in general the patterns were as follows. The children tended to begin by asking questions about the most gross physical features of the culture. Geography, climate, housing, clothing, appliances, and utensils came in for attention. After this period of questioning, which we came to regard as a kind of "physical orientation" to the culture, the children would begin to show individual patterns of questioning. Some would probe religion, some sports and recreation, some handicrafts, and so on. For an individual who asked a good many questions, as a dozen to twenty, two or three themes of questioning might be developed and explored. However, some of the individuals who asked a very few questions managed to spread those over quite a number of categories.

Relation of Input to the Characteristics of the Children

In most school situations, the responsiveness of the children is strongly related to the demographic characteristics of the children and to their scholastic aptitude. In Table Six coefficients of correlation are presented between the Input variables, Reading Achievement, and I. Q.

TABLE SIX

COEFFICIENTS OF CORRELATION BETWEEN INPUT VARIABLES, I.Q., AND READING ACHIEVEMENT FOR THE SIXTH GRADE

		Correlation Coefficients			
		1	2	3	4
No. of Questions Asked	Var. 1	_____	.852**	-.025	-.044
No. of Categories Searched	Var. 2		_____	.203	.139
I. Q.	Var. 3			_____	.588**
Reading Achievement	Var. 4				

** Significant at .01 level

Questions Asked and Categories Searched are related. Not unexpectedly, I. Q. and reading are significantly related. However, neither I. Q. nor reading are related to the input variables, which is a distinct difference from student performance in the normal school situation. Apparently, students of low intelligence and reading achievement searched as much as did students of high capacity and achievement. The coefficients for the second and the fourth grade were almost identical to the above, and thus are not presented. Reading and I. Q. were not related to Input in any grade, but were related to each other.

Output Variables

As described in Chapter Four, the students' output tapes were described in terms of number and type of themes generated and concepts supporting those themes. In Table Seven are presented the means and standard deviations of the ouput variables by grade.

TABLE SEVEN

OUTPUT BY GRADE: MEANS OF THEMES AND CONCEPTS GENERATED

	Grade 2		Grade 4		Grade 6
N	30		43		35
Themes:					
Mean	5.933		12.429		10.881
SD	4.213		7.237		3.710
Mean differences between adjoining grades		6.496		1.548	
t values (significance)		6.191[1] ($p<.001$)		1.209[1] ($p<.23$)	
Concepts:					
Mean	0.700		3.371		2.310
SD	0.813		3.812		2.170
Mean differences between adjoining grades		2.671[1]		1.062[1]	
t values (significance)		4.650 ($p<.001$		1.539 ($p<.13$)	

[1] Variances not assumed equal. Welch's correction was used.

There are several interesting features about the output data. First, it is not unexpected that the grade two means should be substantially below those of the other two grades. However, it is interesting to notice that the mean number of themes generated by the second graders is much larger than the mean number of questions and categories which they searched. Apparently, they were able to transform the data they retrieved into quite a number of elements with which they described the culture. Nonetheless, their number of themes generated is significantly less than those of the other grades, and the number of concepts they generated was almost non-existent. In fact, twenty-two of the second graders generated no concepts at all in their output and eight of the twenty-one concepts which were generated were produced by one student. In themes they manifested a very large range with five of the thirty students generating over ten themes, while the others were bunched about the mean. Some second graders, evidently, are able to make meaningful use of the data they withdraw from the system.

The really striking feature of the data, however, are the lack of differences between the fourth and sixth grade. More striking is the fact that the fourth grade students were so much more variable than the sixth grade students in both themes and concepts generated, and that the difference in concepts almost reached the level of significance.

These findings accord with the informal observations by the research assistants working with the students at Broad River School. In that school, especially in the Free Inquiry Task, the greatest enthusiasm appeared to be manifested by fourth grade children. This was not so true of some of the other tasks nor was it true of the students within the more completely middle-class school in the other suburban community.

The data also reveal that the number of themes which were generated at all grade levels was much less than the number of concepts which were developed to support the data. Most of the output tapes were additive rather than conceptual in style, as we will presently see. That is, students frequently "strung together" one theme after another, rather than making a conceptualized description of the culture. Because the conceptual property of output did not increase over the grades, we may conjecture that an important research effort should explore ways of teaching children how to conceptualize cultures. We will return to this question in later chapters, in the studies which induce children to explore social problems, social science concepts, and ways of thinking about cultures. We will look at this aspect of the data more closely when we consider content of output very shortly.

In Table Eight coefficients of correlation are presented between output variables and I. Q., Reading Achievement, and Parents' Occupation.

TABLE EIGHT

COEFFICIENTS OF CORRELATION BETWEEN OUTPUT VARIABLES AND CHARACTERISTICS OF STUDENTS

Variable Description		Correlation Coefficients 1	2	3	4	5
No. of Themes	Var. 1	____	.180	.037	.260	.104
No. of Concepts	Var. 2		____	.196	-.046	.157
I. Q.	Var. 3			____	-.146	.588**
Parents' Occupation	Var. 4				____	-.398*
Reading	Var. 5					____

Number of Themes and Numbers of Concepts were unrelated. Some producers of many themes produced few concepts and vice versa. The small frequency of concepts, however, made it unlikely that concept production would be related to any variable. Neither output variable was related to I. Q., Reading Level, or Parents' Occupation.

Evidently, the latter variables, so closely related to school performance, do not affect either input or output when students are in the Information Systems environment. It should be remembered, of course, that amount learned was not specifically investigated in this study.

Both I. Q. and Parents' Occupation are related to reading achievement, although Parents' Occupation and Reading are inversely related, which is not usually the case.

As indicated in Chapter Four the output from most of the tasks during the entire project consisted of tape recordings which were transcribed and then analyzed in ways that depended on the type of study to which the output related. In the next few pages there appear a number of such transcripts.

These are unedited, except for the punctuation which was added by the typist who was making inferences from the children's inflections. Some of the transcripts are long and some are short. Some are "additive" in nature, and consist of one idea after another strung out with little connection between them. Others are series of ideas but connected or related to each other in some way. Yet others are rather conceptual in descriptions in which the unity and diversity of information is handled in terms of some ideas which were generated by the children. We include the tapes at this point before going on in order to give a flavor of the kind of data which was worked with throughout the project.

Output for Student "A" in the Free Inquiry Task

> Hello. I want to tell you about La Stella. First of all La Stella is in New Mexico. The people who live in La Stella are Indians. They make war drums, and they always had wars in earlier days. In La Stella they have many gardens, but most of all they ship in their food from many places, like America. Very often they have rain ceremonies and dance ceremonies. Most often they believe in more than one God, such as Sun God and Rain God. La Stella has houses made out of sand, mud, and other rocks and minerals such as. La Stella is also a city of making little drums. They have they're made out of hide, some deer and buffalo and they're stretched over a little barrel. As I said before they have little ceremonies, except they have it in a special spot by a little tree, and they dance around the tree if they rain, and dance the opposite way around if they need any sun. La Stella is also called a pueblo city. That's a Spanish word for any city that is Spanish. You may go and visit the pueblo in New Mexico, if your mother and father will take you. If you go there, I hope you have a nice time. On the other hand La Stella is a very beautiful city. You can go and visit museums and art galleries. If you go to one of the art galleries, it's really called an "expo-expobition." And when you go you will see statues of great warriors and other things like that. Also in La Stella they have statues of great warriors and things like that. (Repeated) If you have a special teacher in your school, you will also find out that she will take you in and you will study La Stella. I hope you have a very nice time. In La Stella you have to work to live. If you don't work to live you will probably die if you

live in a home all by yourself. A person in La Stella could not live by himself in a home. In La Stella they have a little mud stoves that heat up very quickly. They look very much like our own, except they're made out of mud and hardened into cement. The people. The ladies in La Stella bake bread for the other people. They are always over near the ovens taking these little slides with a pole attached to them out and in the oven. Of course if you were in La Stella, this wouldn't be very convenient for you. I'm very sure you would like to visit La Stella. It is a very nice city, and you can do a lot of--play a lot of games and then they would let you go on a hunt. If you take a special test you may go on a buffalo hunt or a deer hunt. There are very many jungles out in La Stella. In La Stella they make very beautiful pots and bowls. Then after they make'em out of plaster they will take little decorative paint and paint them up. In La Stella they have a baseball field for boys and girls, they also have farms with little rivers running through on a little cross pattern. And they have houses put together right next to each other on a one block. All next to each other. For one of the dances they have two little kids and in two little eagle costumes dancing around in a circle. They have doctors and medical cares when women are going to have baby or someone is hurt. In La Stella they have a little shop for souveniers for visitors that come, and you may buy shields, spears, and things like that.

Output for Student "B" in the Free Inquiry Task

Today I am going to answer some questions for you, I hope you will enjoy them. Today's episode is about La Stella. La Stella is a big country. On the questions I asked, "What is the lands like?" It is a big land and they have lots of ditches around there and the people, the way they get the water is so easy and they have big ditches. We don't have ditches, but sometimes we do. We have water, we have waterfalls, springs, anything else you can name. We don't have ditches, we may have some but--has a big rains but when they have ranges when they say that they mean that a the lawns are big and they have range like, start now. When they have jobs like we do they they have different jobs. They have like employers that work and sometimes it is hard for them to keep up with the work they do and the work they do is hard because they have to dig big ditches along this thing and then sometimes they have real big waterfalls not exactly but they have big little springs that and a I think it is hard for them to do their work so I don't know about that because they have very hard work and I don't mind them from sitting down and resting for a while. That is all I have to say now.

When the people in La Stella carry when they carry their bottles on their head for them to take on their heads is awful heavy they don't have anything to carry it in but we have some water at our faucets but they don't have none, have one. But it is hard to carry them big heavy bottles they make to carry on their heads because them bottles they carry on their heads sometimes they have food in it, and bananas and stuff and they have water to carry. They have big ditches and it is clean water and then they go there and just get their water from there they puts the bottle in and bring it up there is lots of water, they put it on their head and then they go to the village wherever they are taking it. That's all I have to say now.

When they have like, excuse that. Them people, Today's episode is about how do they get the water to--the fields. When they mean evaporate, sometimes they be short in their water and their water evaporates up into the sky and it disappears and then at rainy days the rain, the water comes down that had evaporates back into the ditches like on hot days the water goes up when it's cloudy the water, rain, the water is coming down into the ditches. That is the way they have water. They wouldn't of had water if it wasn't of for God who made the water, he didn't exactly make the water but when people dig ditches they see, they dig water up and water comes out and they dig it very far and then the water like on very very hot days the water evaporates into the sky and on cloudy days it comes back down in the ditches that way they all have the same.

I'm going to sing a song for you. It's a Christmas song I hope you will enjoy it. We wish you a merry Christmas, we wish you a merry Christmas, we wish you a merry Christmas and a happy new year. Good tidings we bring for you and our gang we wish you a merry Christmas and a happy new year. Oh bring us a figgy pudding, oh bring us a figgy pudding, oh bring us a figgy pudding and bring it right here. We won't go until we get some, we won't go until we get some, we won't go until we get some, so bring it right here. Merry Christmas Mrs. Greene. I'm going to sing you another Christmas song, it's about jolly old St. Nicholas. Jolly old St. Nicholas--don't you tell a single soul what I'm going to say. Christmas eve will soon be here now you dear old man whisper what I bring to you tell me if you can. Johnny wants a pair of skates, Susie wants a fan, Nellie wants a story book one she hasn't read. As for me I hardly know so I--dear Santa Claus what you think is best. Thank you and a Merry Christmas Mrs. Greene, and everybody and all a good night.

Now I'm going to tell you a little story. Once upon a time Santa Claus, Santa Claus and his workshop. Well you know we had a play about Santa Claus and night. It was very good and a very good play and of course we didn't do it, but I think we would do it if Mrs. Mears would let us. Maybe on the 22nd. O. K. Oh, I put it in here, I'll stop it.

Output for Student "C" in the Free Inquiry Task

This is La Stella, a story about La Stella. These people are still living now a days. They use the same materials we use now a days. They make drums like us. They have different materials we have. Sometimes it was hot, sometimes it was cold, sometimes it rained. Their houses looked different long ago in the olden days. We would like to see it. Their houses are different than ours today a long time ago. In the olden days they had games like us. They played football and kickball. They had foot races for children when they were small, from any age from six to twelve. When I saw the games they played a long time ago it was old fashioned than I thought they would be and I had a lot of fun just watching the tapes and listening to 'em. I had a lot of fun looking at the slide projectors and working with Mrs. Greene. When I was looking at the slide projector I felt like I was right in La Stella, right there now. I hope again I can come and see about more about La Stella and how the people live, work, play and do and make things. There were a lot of things to work about and study on about La Stella now a days and in the olden days.

They had old fashioned stoves like we had, we did not have a long time ago. Even though it was a long time they look like Indians and they were still called citizens.

Their houses looked, well old when I saw them in the slide projector. I saw them in about 1876. It was fun to look at the pictures. When I was over here in the room where I saw the slide projector and the tape recorder there was a drum that someone had brought back from the olden days in 1876. When I saw it, it looked like one of almost one of the drums now a days that Indians work. When they brought it back here it was new. The materials are fun to look at. When I asked what materials do they make drums out of, I felt funny because when I looked at the slide projector with the pictures of how they make their materials I thought I was right there in La Stella making the drums. It was a whole group of people, well their family doing making drums and when they make drums they use cowhide, horsehide, any kind of hide and they used paint to paint some of the things on the drums. And when I found out about La Stella it was fun just looking at the tapes. I wished I were, well right there now because I would like to learn more and study about La Stella and how they work, play and do things more often. If they were still living in the olden days like they were I would like to go there and see it even though it cost a lot of money I'd like to go there and see it. It was nice for having a slide projector and having a lot of fun.

When I only learned a little about La Stella but when I grow up and go in the higher grades maybe I'll learn more about La Stella, really study more and when I do learn about more about La Stella I might even write a letter to Mrs. Greene for helping me. I didn't have time to write a letter to Mrs. Greene about La Stella and how much more I learned about La Stella, I will sometimes come and see her. If there isn't enough time to go see her I'll try to get somehow and contact her and tell her more that I learned about La Stella and it was fun learning about La Stella. Now when I learn more about La Stella it will be fun just learning but when I am alone in I'm in the higher grades and I'm alone and I'm sitting around doing nothing I could take out a book about La Stella. I can't get in touch with Mrs. Greene about more that I learned about La Stella, I'll try to contact her and maybe even see her again, I hope that I will learn more and study more about La Stella because it is an interesting subject to study about. If I was there today, November 30, 1967 I'd like to see it, but if I couldn't I'd try to see someone who knows more about La Stella like the person who just invented the tapes and slide projector. I'd like to know what he has seen there if he can give all the information that he should. But even though I don't care because if I know him and I find him I will ask him more about La Stella even though it is hard to just sit down and listen when you've got homework I'd like to learn more because La Stella is a nice place to visit and a nice place to learn. When I get home today November 30, 1967, I will tell my mother and my father and my little brother about what I have learned about La Stella. Even though I have learned a little bit I will learn more because I will tell 'em and even though I learned a little bit they'll know what I am trying to get to. I'll tell them that I made a tape about La Stella, maybe my mother, father and brother will understand. So when I tell my brother and he is young when he gets into the fourth grade or maybe even higher than me he will learn a lot more about La Stella, maybe even the same that I learned. Well, I wish I could say more about La Stella but now I am getting close to the end of the tape so thank you for listening to this tape. Bye.

Output for Student "D" in the Free Inquiry Task

La Stella is a city in New Mexico. New Mexico is in America. Some of the people in La Stella dress like us and have houses like us. They sometimes talk like us and go to school and the houses are like pueblos and they are made out of hard sand. They dance like Indians, they are like Indians of course, but don't have things like we do. Like big ice cream parlors and everything. But, well what do you expect, it's in New Mexico. And they don't have cars, new cars and big big towns and stores with pretty dresses in, but it probably nice, I've never been there and they have doctors. I do not know if they have libraries or books that are new and nice and thick, maybe they have a few but not a lot. I do not know if there is a big population in La Stella, but it's probably quite a few, not as many as there is in where I live, but there should be quite a few.

They make drums out of skin, big ones, small ones, and they color the skin and they have colorful drums.

They probably get the water from the river if there was one if there is one nearby. But I do not know if they have big houses like we do. And they probably don't have traffic lights because they don't have big cars like we do. Imagine them running around in a car on their sandy roads, and traffic lights. I can't imagine it in La Stella because, I don't know really, they probably look a little different than we do. Course nobody ever looks the same as anybody else looks unless they're twins.

They play baseball and races and they have these games and they have fun and everything and probably have feasts once in a while. They have big farms. They grow cabbage and carrots and all these things on it and if it doesn't rain it might, well all the plants will die so it is very hard for them, I guess.

There is some, very few of them live in, they don't have big houses because, well their houses are wood and cement and plaster. I do not think they have very very good schools like we have here where I live. They probably have a two room school where they have children go morning and afternoon and then the fathers and mothers come to learn about money and how to grow crops and everything. I think that's what they really do. The fathers and mothers do not earn so much money because they don't have big working areas and factories. They probably earn about fifteen dollars a week or a day. I doubt a day it's probably a week. I guess that could do though. I do not know if they trade things like for drums for money or something like that. And the money in La Stella does not look like the money we have here in America, well it might, I don't know, but I doubt it.

They probably make their furniture out of wood and things like they chop down trees and carve them out and make chairs and beds, and the mothers buy material to make pillows and blankets. I guess they don't have double deckers and all these kind of houses like they have in New York, big mansions and hundred apartments in one building. They probably have one house and two families live in there or one or just a couple. Well I do not know really, because I've never been there. All I've seen is on slides and tapes. That's all I really know about it.

Output for Student "E" in the Free Inquiry Task

La Stella was nice country and they were all Indians. La Stella is a nice country, and they I asked about--and I--what kind of beds they have are. They sleep on things like rocks and, not rocks. They sleep right on hard pillow, and I asked what kind of schools they are and their schools are made of beaver rocks, and there they do not ride by cars. They have to ride by horse or wagon, and they have nice horses, and they ride horses very gently. They ride horses like very good Indians. They are good on horses, and they have nice wagons, coach wagons and everything. Their houses are pretty good, but they live in and they're right underneath caves, and they have to their houses are all made of big cave rocks and. They have one big ladder going up to their houses. They gave nice, they make their own ladders and stuff so they can get in into their caves and into their house really, and. It's only one little hole that they can get into their house with so sometimes it would be better for them so that when it rains so much rain don't get in. Another houses. All their houses are the same. None of them have any--just dirt. They have dirt and rocks and they are made of big caves that they have more room to live in their houses so they can do things. So they don't have to be crowded they might not have enough room to do anything. Or they have to have a lot of room, because if like say they have to wash dishes or anything they might not have any room to do, like if they have kids and stuff their kids might be in their way or even if their husband has to go out hunting or something and he has to get something there. There wouldn't be enough room. So they have to have big caves so that the children can play in the houses if like it's raining out or something. Which it hardly ever does in Las Stella because its a dry country and hardly none--there's in. It's good hunting up there. They have fights sometimes, but they have good hunters. They really throw a spear so they need the room at their houses so they can get their stuff if they need it to go hunting. Or in case ever a fight comes. If their wife's in the way washing dishes what's she going to do. Supposing someone attacks them where are they going to hide in a little house? So they have to have a big house so they can really hide or if they have to--so they'll have enough room for company to come and sleep over or something and all the houses have to be big so they have enough room. And on the outside of their houses they have dirt and rocks. Rocks first. It's a big cave with dirt covering, and maybe there is grass on top of it or something, and in their houses--have are made of all dirt in the inside and lay on the ground or something, but their houses on the inside are top like the walls and everything they're made of a all stones, big stones. And a cave and probably a little bit of dirt and stuff, but I think it's mostly made of all dirt on the bottom and all rocks on top because there's dirt on the top of the walls and on top of the ceiling and on top of the house it'll fall all over you and you'll get all dirty and if anybody ever comes over they get all dirty and everything so. So what's the use of having dirt on the walls and everything when they should be clean and have nice walls with just rocks so they can really have a nice time in their houses cause they're all made of rock and everything so they have the dirt on the floor more than they would have on the ceiling so they don't get all dirty. Here their mothers have to take care of the houses just like up in here. They have to take as good care of their houses like. It would be. It's just like to them like it is to us, our houses. They're so good to us, and their houses are so good to them and so their wives and stuff have to keep as good care of their houses as our mothers would have to take care of their because to them it's just a plain house, and they think it's a real house like one of ours. They probably don't even know what our houses are like. They probably think our houses are just like theirs, but they have very nice houses, they think, and they're not really that bad of a house, because after all they have to find their houses and their mothers when they have to clean up and everything clean all the house and everything. They keep as good care as our mothers would keep care of ours. And this is another thing they--I have to take smoke cigarettes or pipes or cigars. They have this big place that they go to and the Indians planted it all tobacco seeds and everything, and the Indians planted it all by themselves, so they could make cigarettes, and cigars, and pipes. Well the pipes the tobacco comes in that they just put in the pipes. But on cigarettes and cigars. They on the outside is like a leaf and then they stuff 'em. They pack on the cigars a big leaf like but its like paper leaf, and they make it so it won't just turn to fire. They put some ingredient stuff on and so a that their cigars just don't turn to fire and something they put on their top of it a leaf like so it doesn't turn to fire so that just burn and the tobacco doesn't some of the tobacco after they make, get the leaves and everything they put on the cigar, they put in the cigar and on the cigarettes they do the same exact thing except a different color and everything is different on there, because it's skinnier and they. I didn't ask if they had filters on their cigarettes, but I think they do and they make it like cotton inside maybe something.

Output for Student "F" in the Free Inquiry Task

This is the story of La Stella. (oh boy) This is the story of La Stella. La Stella is a very small town. It is a very very small town. Up at the right of your map you will see a baseball field. On the left side of the map you will see a church. On the right side of your map you will see some red lines. Those red lines with the x's on them are called irrigation ditches. On the left side you will see a church. Do you know about the people of La Stella? They are Indians. Those people are very big Indians. Over on the side of the shelf you will see some filmstrips. You shall ask your teacher and she shall select the films for you if you do not know. You can ask as many questions as you like, but just keep on asking them until you think you've learned enough about the town of La Stella. Do you know how they communicate? Why? Ask these questions if you like. What do the people eat? Do you know? Ask these questions. I shall ask some more questions if you want to know, just ask your teacher. How do they make their dishes? That's one. This is the second. Do they have schools a long time ago? No. You will be hearing a tape about this one. How do they make their war masks? It's on the area file 293-2. Thank you for listening to La Stella. Now go ask your teacher what you should do. There.

Output for Student "G" in the Free Inquiry Task

I learned about La Stella that, how they make their drums. They take wood and they decorate it and they put it in a round shape and they take this stuff and they put it on top, and that's how they make their drums.

Some people wear baskets on their heads. Some people wear shawls on their heads. They wear jewelry on them. In La Stella they wear jewelry because when they have dances they have to wear jewelry to make up themselves to look like, to the things they have to do in La Stella. In La Stella they have rain dances to make it rain. They have sun dances to make it sun, because when they grow stuff they have to have rain and sun and they do their dances.

In La Stella they put makeup on themselves, they put makeup on themselves to have the rain dances and they put the jewelry on because the kinds of dances they have to put jewelry and makeup on.

In La Stella they have horses there because nobody invented cars. They never invented wagons or anything. In La Stella, in La Stella they go barefoot. Some people make sandals and shoes but sometimes they do not fit them because they do not know what size they take.

In La Stella they wear baskets on their heads just in case it rains or something and they do not have tents and they have to go with somebody else and it does not fit. They might have to stay out under a tree or something and their baskets protect their heads and if they are too big for their head----------and they will protect the clothing.

In La Stella because they are only Indians there, in La Stella because there are only Indians there, because there is this------and this little girl who was there first and some other things that there were people who made the children.

Output for Student "H" in the Free Inquiry Task

In La Stella they have big some have big houses and some have little houses. The houses are made of harden mud, some of them are made of clay. The city of Mexico is in with 30 miles from La Stella. In La Stella they wear clothes much like we do in America. For dances they wear brightly colored clothes. In La Stella they eat food much like we do. The children eat the same food as adults only they have smaller portions. They have corn, coffee and different kinds of food like we have.

The people in La Stella, they have many celebrations and many dances. They dance for rain and they dance for war, they dance at many different parties. They play games like baseball and many games. They have many races. In La Stella in the summertime the temperatures go up to 90 degrees. It is, in the summer it is hot and dry and they don't have many rainfalls.

Output for Student "I" in the Free Inquiry Task

I can't think of anything right now.

I can go to La Stella and make guns for them, and make guns to help them shoot animals like a rabbit or something. I remember that they told me that they don't do much hunting in La Stella so I think it would be a good idea instead of using arrows and knives they could use guns.

I could go to La Stella and make new clothes for them so that they could dress regular like we do. I learned another thing, they make pottery, drums and other things. They ride automobiles too. They eat three times a day just like we do. They eat regular things like bread and other things.

They get their lights from electricity. Not many people live in La Stella. Many of the Indians like La Stella. They do rain dances and most of them always go barefoot instead of wearing socks and shoes like we do. Their stoves are not electric like ours, they're not gas either. They have some other kind. The people make drums and sell them at the store. I saw a slide of the way a grandfather and a little boy looks. Only a few people live in La Stella. Most of the people are Indians. Some of the boys have long hair in La Stella. They don't eat much in the daytime, but they do eat three times a day. The walls are made of some kind of dry mud. Only a few of them ride on burros and horses and wagons. I saw a slide of the way houses looked in those days. Only few of them have TV sets and other things like that. Only a couple have radios, too. Most of the men buy their food at the store. The ground is usually like a desert, all sand and rock. The people in La Stella have Spanish names. I think the people in La Stella talk English but I don't know. The people in La Stella do a lot of rain dances. I don't think any of them live in caves, I don't know. The people in La Stella have-----of living. Their clothes are much different from ours. Many of them make a living by making drums. Most of them make drums for a living. I don't really know if there are buffalo herds anymore, but I think there are. If I went to La Stella and I came home I could tell all my friends about how they dress, what they walk in on their feet, socks and shoes. I think we live a better life than they do, but to them they think they do. Many of the people in La Stella like different things instead of other things like we do. I don't think I would want to live in La Stella the way they do. In La Stella they don't ride in canoes. I asked that question, but there were no answers to it. The men eat----and bread and those things but they really eat that much. I think the men eat more than the ladies, even though the men don't eat a lot but I still think the men eat more.

Many of the Indians in La Stella are friendly and they don't hurt us people, like shoot arrows or anything like that. Some of the Indians are bad, but I don't think all of them are. Most of them are good. The men don't really like to eat a lot because they don't really like to eat. They really make their living on making drums or anything like that. They make any kind of pottery you can think of. I'd really like to see a picture of the way the Indians hunt, I'd like to see how they really walk and hunt. The slides really told me a lot and the description really told me too and I looked at the picture and the description told me what they were doing and everything. You know, I'd like to go to La Stella but not live there. It may be a nice place, but I wouldn't want to live there.

Some of the people in La Stella never even heard of trucks. Most of the people in La Stella go barefooted, only a few of them have sandals. They walk a lot in La Stella. When the men are out hunting or going to the store to get some food, the ladies are cooking bread. The men don't buy that much at the store because they don't eat that much. People in La Stella have a lot of fun. Hey, I wonder what they sleep on, maybe beds or something else but it sure isn't-----. They probably eat outside and sometimes sleep outside but yet I wouldn't want to eat outside----or sleep outside either. I would be too hot with covers on outside, it is real hot over there. You want to know something, I really did learn a lot about tapes and everything. I learned a lot about the slides and it was a lot of fun. I had eleven slides to look at, you know questions I asked. Many of them, only a few of them own a few things like a television, a radio and other things like that. Many of the people in our state have a lot of things to have like a radio, a TV, a house, a bed and everything like that. But only a few of them have those things in La Stella. You know something, I'll take that back about I don't want to sleep over there or eat outside because maybe it is fun to sleep out there. I sure wouldn't want to have a raccoon after me. I wish I could go to La Stella, you know that? I wonder if La Stella is a state, a country or what. I think it is a state, more like a city. They have baseball fields there so they must play baseball there. One thing I like about La Stella its really hot almost every year and that's why I like it cause I won't have to wear a coat. I wonder if they go swimming, I think they do in a brook or something like that, either a river or a brook. Gee, if they go swimming I wonder why they don't ride in canoes? They probably chop down trees to make fire wood. No, I'll take that back because it is so hot there they probably won't even need fire wood. I know one thing they won't need a fireplace. They won't need firewood and they won't need a fireplace.

I asked eleven questions about La Stella and I learned a lot, but I wasn't going to make my tape today but I did. Gee, maybe some of the people in La Stella do visit the United States. The children of La Stella I think they do go to schools like we do but not, they're not really like our schools. Most of the children in La Stella are very young when they start school at five years old.

There are a lot of things I could tell about La Stella. It is a nice place too. You know something, I really would have fun in La Stella if I went there, but I wouldn't want to go to their schools because they're not like our elementary schools. You know why I wouldn't want to go to the schools? Because the walls aren't the same and any day they might cave in on you. The schools are probably just made out of wood and stuff like that or dried mud. I don't think they're anything like our schools. I wonder if the children get away with things like we do in our school? Gee, I doubt it but it, but I think they go to churches like we do. Most of the kids in La Stella go to school. I like La Stella, it is a nice place. You know, I've been thinking it over, it has a lot of things like we do but not as good as ours. La Stella is a nice to visit, but I sure wouldn't want to live there.

Output for Student "J" in the Free Inquiry Task

Hello. My name is-----, and I'm going to tell you about La Stella the way I learned it. What kind of costumes do they wear for special occasions? In La Stella they have many festivals. One of the festivals they have is every Sunday they celebrate not only for their special occasions but for rejoicing the Sabbath day. In La Stella there are games they plan on special occasions. One of the games is called---they sit around a stick like I don't know what they call it, but they just sit around a stick. They could take a hollow wooden board. They sit around it, and they pitch little rocks or stones and then they have. It's just like if you're Jewish just playing a game. How many people are there in La Stella? Well there is-----to be a true member of La Stella you have to be at least 18 to be a citizen. When you become a citizen you are considered----you own a part of La Stella. When it comes, when it comes not to be La Stella any more you just----you could sit back and not pay up any debts that you have. What products do they raise? Excuse me. What is it that they raise? It is corn, wheat and rice. Yes, rice. You probably thinking about China. China uses rice. The rice is very important to the people of La Stella. Many men make money in raising crops. Wheat and crops. Do they make things like pottery in La Stella? Well, the women are not allowed to make pottery until they are 18 years of age. They make pottery when they are 18 years of age and it helps to make money. Then they make drums of all sorts. That's when they make money. Some families are experts at making drums. Like family I saw on the slide. Well, that family was called the McGongos, so they decided to make drums that's why everybody calls them the Gongos. My next question is that I ask, what kind of schools do they have for education? The schools that they have are very much like schools they have here today.

They are made of bricks and they have Jungle Jims OUTSIDE and they're mostly of yellow brick. I don't know why but this is just so. After I have, I've gone to school six years cause I'm in the sixth grade. And I have learned that in Greece now I know I am going up---in here we are sent to the office or get into trouble or something. In other schools, well---ha---that's what they tell me. All right. This is the end of our tape recording. Thank you very much Mrs. Greene and Mrs. Ilowe. Ha Ha Ha Ha (laughing at the teacher)

Output for Student "K" in the Free Inquiry Task

This is a story about La Stella. There are a lot of things about La Stella that I have to tell you. The clothes that they wear are not very different from ours. They have---some are raggedy and some aren't. The houses are made out of bricks or mud or something and the houses aren't very light and some are small. If you get married in La Stella you can either stay---you can get married and stay together or you can either break-up. You can still get married over again, but if you don't want to stay together, the wife or the man has to sleep outside of the house. Before you get married the boy usually has to go over to the girl's house and they greet him with presents. And then the girl has to go over to the boy's house and then she gets greeted with presents. Usually if you do break-up you can always go and get a new wife, but you're still married together. La Stella is a very nice place and I wish I could visit there too. Pottery that is made there is made out of clay. Most of them are round or square or any kind and they paint them designs and. The people there aren't very much different from us, but sometimes they are I think. For music there are either use bottle drums, or drums, or these little things they shake around with little beads in them. The little children there keep little pets or animals for their house so they can have a friend or something to play with. The children mostly they have friends there, a lot of friends. They usually eat for breakfast, dinner and supper, they usually eat corn meals with vegetables or with fruit. La Stella is a nice place, and if you were there I think you would like it too. There are a lot of things to look at, the people, the clothes and the way they make their food in the pottery. The way that they communicate is by either playing the drums or by men going on horses going to and telling the people about what happened or what's going to happen or any wars or something like that. For food sometimes they usually go out and hunt or something. They usually make their food or catch the animals. If you ever did go to La Stella you would like to look at all the things. It is it isn't very interesting place to see, what they do and what they see and what you see. I hope someday that you go and visit La Stella and see all the wonderful things there are.

Output for Student "L" in the Free Inquiry Task

New Mexico . . . .

The people that live in La Stella are Indians. Their dances are called buffalo dances. The children dance eagle dances. The mountains that La Stella has are about 11,000 feet. The Indians' city is about 12,000 feet above sea level. The houses--in the middle of the houses is a plaza. The houses are called pueblos. Their ovens are shaped like big giant bee hives. The Indians hunt deer and rabbit. When a new house is made, the witch blesses it. The buffalo dance men wear buffalo skins and buffalo horns. In the eagle dance the children dress up as eagles. In the hunt men split up and go by themselves.

Classification of Themes in Terms of Area File Categories

All of the teams for all three grades were classified in terms of the area file categories as was the case with the questions. The results were very similar to the classification of questions. Particularly, the differences between the grades were similar in that the older children tended to generate more themes about more intangible aspects of the culture and the range of themes generated was considerably greater. Because the content of output will be looked at specifically in connection with some of the other studies and because the relationship between input and output will be more thoroughly related and investigated in some of the later studies, the lengthy data concerning the classification of themes will not be presented and discussed here.

Input versus Output

How does input relate to output? Does quantity of output relate to quantity of input? Is the content of output related to the content of input?

Let us approach this question first by examining quantity of input and output. In Table Nine there are presented correlations between the number of questions asked, categories searched, and the number of themes generated and concepts developed in the output tapes by the sixth grade students.

TABLE NINE

CORRELATIONS BETWEEN INPUT AND OUTPUT VARIABLES FOR THE SIXTH GRADE

Var. No.	1	2	3	4
1. Questions Asked	_____	.852**	.463**	.257
2. Categories Searched		_____	.338*	.173
3. Themes Generated			_____	.180
4. Concepts Developed				_____

The very low frequency of "concepts developed" makes its interpretation in terms of correlation coefficients difficult and dubious. Although its correlations are all low, and below the significance level, they are consistently positive.

One suspects that our power in measuring developed concepts is low, and that greater power might increase the magnitude of correlation.

The correlations between "themes generated" and the input variables are positive, although somewhat lower than the correlations between the input variables alone. Clearly, the more questions asked, and the more categories searched, the more complex were the descriptions of the culture in terms of the number of themes that students used in talking about it. The results suggest that it would be worthwhile to conduct experiments to increase input and determine the effect on output. However, the correlation is low enough to suggest that input does not entirely account for output. Later, we will examine input and output relationships in problem-solving tasks.

Let us turn now to the pattern of fourth grade input and output coefficients.

TABLE TEN

CORRELATIONS BETWEEN INPUT AND OUTPUT
VARIABLES FOR THE FOURTH GRADE

	1	2	3	4
1	______	.839**	.168	.072
2		______	.087	.066
3			______	.654
4				______

From Table Ten it is evident that the input variables were positively correlated with each other, the output variables were positively correlated, but Input and Output were not significantly related. Some students turned relatively little input into high output and some others received much input but made relatively meager descriptions of the culture.

Clearly, a specific series of investigations needs to be designed to probe information--processing as such--to pin down input strategies, styles of conceptualization, and the effects on those variables of training. We will visit this question again in Chapter Six, when we examine input and output relationships in the "business" task.

Summary: The Free Inquiry Task

The Free Inquiry Study represented the first attempt to bring the children into contact with the data storage and retrieval system with no more directions than the minimum which would get them started inquiring into a culture. Consequently, the relatively non-directional task was presented to the children: "Learn about this place and its people until you feel you are ready to teach another child about them." The data which have been discussed in this chapter were the "input" and "output" variables that resulted from the task. Particularly, the questions the children asked, the categories they searched, the themes they generated in describing the culture, and the concepts they generated while describing it were analyzed and related to each other and the characteristics of the children.

Clearly, a wide-ranging category system was necessary to "hold" the questions that the children asked, although whether quite such a broad category system as we used is necessary is not clear from this study alone. That question will be explored later again and again culminating in one specific study which explored a different and much smaller category system.

It appears somewhat questionable that the system can be used by all second graders, despite the lengthy and enthusiastic use which was made of it by the relatively affluent second graders who engaged in the pilot study. Socio-economic variables may affect input into the system but apparently were unrelated to the output variables, raising a complex of questions about the relationship of this kind of support system to lower class children especially. Apparently, once the less advantaged children become engaged with the system they can effectively take information away from it but the problem of engaging them in the system has not yet been solved.

The content of the questions asked and the themes generated by the children indicate that the more tangible aspects of the culture are explored first and then the less tangible aspects are explored, particularly by the older children. However, there are many aspects of the cultures which were not explored at all, indicating that we need to study on methods for inducing a wider and more complex search by more children. Analysis of the output variables indicates that many of the children were able to generate a great many lines of inquiry into the culture and translate those into a good many lines of description of the culture once they had finished their personal search. However, the output was rather unconceptual, and the older children were no more conceptual than the younger ones. (At least the sixth grade youngsters were no more conceptual than the fourth grade children.) This finding accords with some of the other findings from developmental studies of social studies learning, in which it has been found that the effects of social studies instruction on children's ability to conceptualize social phenomena are diffuse and minimal. Again, much research is needed to determine what specifically can be done to help elementary school children to become more adequately conceptual in their cultural analyses. Several of the studies reported later in this document bear on that kind of question.

Intelligence is apparently unrelated to either input or output, and although most of the system is written material, reading achievement was not related to the input or output variables. Although we have apparently not yet succeeded in developing a support system which is free of social class variables, it would appear that performance in the system is much less related to the usual factors determining academic achievement (I. Q. and reading achievement) than is normally the case. This question, of course, needs further exploration, but we have theorized that support systems responding as they do to particular questions of the student and his particular interests at the time should be freer from the influences of demographic variables than the ordinary mass instructional system, even individualized ones which can accommodate to the particular learner only by pacing.

It is especially interesting that the fourth grade children generated more themes than did the sixth grade children. This finding bears watching in the subsequent studies, especially because of the informal observation by the research assistants that the fourth grade children were more enthusiastic and more persistent in their search into the culture than were the older children.

In Chapter Twelve there is reported an analysis of the kinds of aid that the children requested during the Free Inquiry Task. This analysis was made in an effort to determine ways that support systems might be improved and made responsive to the children in such a way that they would receive a smooth flow of information with as few problems as possible. At the end of Chapter Six, an investigation of children's performance under somewhat more structured conditions--those induced by a task which placed a specific requirement on the children. "Learn about this culture until you can find out what would be a good business to begin there;" we will compare children's behavior in that task with their behavior in the "Free Inquiry" task.

CHAPTER SIX

THE SECOND STUDY: THE BUSINESS TASK

The business task study was conducted with about 30 students from the third, fourth and sixth grades. The students who participated in the study from the fourth and sixth grades were matched in terms of intelligence and the rating of their parents' occupation with students who participated in the free inquiry study. As indicated in Chapter Five, matched pairs were made and then the students were randomly assigned to the free inquiry or business task study. This enables a comparison of performance under the two task conditions for the fourth and the sixth grade subjects. This comparison appears in the last section of the chapter.

The "business task" which essentially asked the student to study the Pueblo culture until he felt he could speculate on a business that would be likely to succeed there, was selected from a number of tasks which were judged to be somewhat more structured than the free inquiry task and yet still to be relatively open, in that a very large number of lines of inquiry might be generated and an attempt to complete the task and a fairly wide general knowledge of the culture would be necessary for successful completion of the task. The pilot study had suggested that even the slight apparent amount of structure involved in the business task and other similar tasks which provide a slight constraint on the directions of inquiry, affected the behavior of the children considerably. Hence, in analyzing the data we are as concerned with the comparison of the behavior of the children as it is affected by the task conditions as we are in examining between grade variability and other such factors.

Input and Output Variables in the Business Task: Grades Four and Six

Table Eleven presents the means for the input and output variables for grades four and six and presents the results of the statistical comparison of the differences between the means.

TABLE ELEVEN

COMPARISON OF GRADES FOUR AND SIX WITH RESPECT TO INPUT AND OUTPUT VARIABLES: BUSINESS TASK

Variable		Grade 6	Grade 4	Difference	T-Test (Significance)
No. of Questions Asked					
	Mean	7.182	6.259		1.152
	SD	3.235	2.890	0.923	(P=.254)
No. of Categories Searched					
	Mean	13.939	10.963	2.976	1.966
	SD	6.364	5.110		(P=.054)
No. of Themes Granted					
	Mean	6.515	6.692	-.177	-0.176
	SD	4.244	3.222		(P=1.000) approx.
No. of Concepts					
	Mean	1.576	1.038	0.537	1.091
	SD	1.985	1.732		(P=0.28)
Business					
	Mean	2.656	2.667	-0.010	-0.014
	SD	2.925	2.828		(P=1.000) approx.

The input and output variables are the same as those examined in Chapter Five except for the inclusion of one called "business" which consisted of a count of the number of businesses which a student suggested might be good ones.

It can be seen that the only difference between the grades was in terms of the number of categories searched. The sixth grade students asked quite broad questions during the business task, the questions pertaining to almost two categories on the average so that the number of categories which they searched was larger than that which the sixth grade students searched. The output variables, however, were almost equal for the two grades with the number of themes generated, number of concepts employed to describe the culture, and the number of businesses which were suggested being approximately equal.

All of the fourth and sixth grade students were able to handle the tasks adequately in the sense that they generated questions about the culture, were able to recommend businesses, and then were able to go on and describe the culture in terms that could be used to justify the business which was recommended.

The following verbatim transcripts of several of the tapes produced by the children at the end of the business task would give the reader some insight into the kind of content which they generated and the texture of the students' responses. It is worthwhile noting that the tapes reveal much misinformation about the Pueblo as well as accurate information about it, which raises some interesting questions about the utilization of new information by children. Many of the students seem to have vague stereotypes about Indians which they apply to the Pueblo despite the information which they received. For example, several of the students reported that the Indians walked around in bare feet, although a mass of pictures viewed by each child showed the Indians well shod, even a hundred years ago. Yet the stereotype seemed to be stronger than the new information which they were retrieving. We have not looked specifically into this kind of question in the set of studies reported in this report, but there are many important questions of this nature which urgently need examination.

Transcript: Fourth Grade Student "A"

> I think that the best business that the Indians in La Stella could do would be growing crops cause it seems that they have many kinds of crops and from the slides, that they grow many varieties of food, and that they can get a lot of money from the crops. I think that would be just about the best cause it seems that everybody has farming land and that there is plenty of it for everyone and everyone grows plenty of things in it and that would be the best way to get money.
>
> And I think second would be, they have such good highways and roads it seems for Indians like that, they have good roads something almost like a city, they have such good roads. But I think that they could have busses and make money like that, transportation, that it would really be good, because they could have busses and all kinds of transportation because it seems that their ways of transportation are good and I think that would be a second good business.

The government ways, even the officers aren't very good, but I still think that the government, the people could go for government and do work for the government and that way they could get money.

Now it seems that they build things a lot and the houses are made of good bricks and all that, bricks and they look sturdy and I think that they could have good carpenters and that the building would be good for them, building stores and churches and homes cause that would be another good business cause that way they could make money. I think the three best businesses would be the crops, and the transportation ways cause they do have very good things to transport on and then I think working for the government or carpentry would be good businesses and that way they would make their best money and I think that is the best way they could do it.

And for the ladies I think a good business, since it seems their educational system isn't that well, but they do have schools and they are better than a lot of other Indians in that part, and I think by the weather and the climate and things like that, that it wouldn't be bad and it wouldn't be hard for someone to become a teacher cause it doesn't get so bad there, the weather, that they can't--the crops and things. The weather is good, but there is hardly any rain for the crops, that is one thing I forgot to say. There is hardly any rain, but still I think that the crops would be best. Now, as to go back where I came from, the women, I think, they have a good education for Indians and I think that teachers and government officers and all things of this sort it would be very good for them, for ladies, because it seems that there is a lot of schooling for Indians and teachers, and you know all things that need a good education, secretaries, maybe they could transport off to a city and may be a secretary and come back at night. I think the woman, they do, and everyone in La Stella have a good education, I think. Even, I think, the higher class, some poorer people could grow crops and things like that, but for the ones that are well educated I think teaching and maybe transporting off to another city, I think would be really good. That's what I think are the best businesses, growing crops, transportation, and government officers, and working for the government, you know, government officers working for the government, and carpentry, not really carpentry, not with stones you know, building, and for women, teaching and maybe secretaries cause if they can learn these things, I don't know if they can learn it, but maybe they can go off to the city, they have a good education some of them, and I think that would be good business and they could really start.

They grew many kinds of crops in La Stella and for Indians I think that would really be something good. They really make the money and things for crops because they really do this good. They grow mostly corn and wheat, you see, that they make their own homemade bread a lot you see that. They grow vegetables and many things that you never hear of in America, but mostly they grow lots of vegetables and wheat and things of this sort.

The kind of education these people have, they don't have a well to do educational system but they do, the Indians do get to school and they do have a good education by the time they are finished. The conditions aren't that good because they don't have big big schools and all these fancy modern doodads and all these modern things that we have in America now, but they do teach the children and even when they grow up, and they do have a good education, but not that many are lucky enough to be educated. Some people either can't afford it, which they really don't have to pay for it, but some children have to stay home and help their fathers or something like this because they are poor, and their educational system isn't that well, but it is o.k.

And the transportation that these people have is really good. They have highways and I'm not sure about trains there, but I know that the transportation by busses and cars and things of this sort is really good because the things to transport on is very good, they have well roads and highways and things, you know, like that.

I asked "What kind of roads and highways do they have to transport on?" And, this does go with the transportation. They have well, very very good highways and roads, highways go by and they have their own highways and bridges and good roads and have a lot of things to transport on and they do have well transportation too.

"What kind of clothes do these people have and how do they get them?" They wear, most of the boys wear what an American boy would wear, but you know not so fancy, not sometimes not as clean and it is not always ironed and they're not as--everything has to be just so like Americans, they're not like that, but the girls, they wear something like an American girl. A woman wears Indian clothes and so do the older men. Older men wear the real Indian clothes at ceremonies and things like this, you can really tell that they wear the old, their ancestors clothes, but the women, they wear half American, yet you can tell that they wear some Indian clothes and a lot of it is made by themselves. And I asked, "How do they get these clothes?" Well, a lot of it is imported, but a lot of it is made by them, themselves, cause Indians have learned how to make a lot of their clothes from their ancestors and this was mostly how they made their clothes.

I asked, "What kind of government do these people have?" I mean like a city, you know like in the city, like a mayor. These people they have almost exactly like a city, they have war lieutenants and colonels, many war people and they have a governor, a mayor, and they have things like a city and the government is a pretty good one except for the government can't make the people do what the government wants them to do. They don't obey the government like they are supposed to do. And the government isn't that strong, they're not that wonderful but they do have a good government, whether it's strong or not. I mean the people in it are good. And one thing about the government is that you're not elected for a lot of things, it's one, the mayor, let's say the war lieut--, no let's say an officer, it's time for him to give up his job, he goes out and he pick another person or something like that, I think it is the governor and mayor that are the only ones who are voted. It's not too much like a city in that sense.

And I asked, "What kind of weather do they have, weather and climate?" Well, the weather is warm, very warm in the summer, and warm almost all year long. And they have very very little rain. They have about in about five years, as much as New York does, no, about as much as New York does in two years. They have very little rain, and the climate, it is warm there, almost always warm and it's hot almost all year round. The humidity is great. And of course they have very little rain and I don't think they have any snow, I'm not too sure about that.

The next question I asked was, "What is their religion like?" Well about 90% of these people are Catholic. There are other religions and they go and they worship in a church which they call, well not really they didn't really call their church, the place where they had ceremonies and celebrations and things was called the Kiva. And this was I think in the Catholic religion, though there are many kinds of religions, but the main religion was Catholic.

"What language do they speak?" Well, these people speak English, a lot of it, because they are taught in school and sometimes their parents teach them. They also, I think, they speak Spanish, that is their main tongue, I think.

"What do the children do for fun?" Well, one of the main games they play is baseball. They play baseball just like the Americans do. They have their uniforms and they play just as if they were in America, it's almost the same thing. They play baseball the same way and they have teams in the summertime. They play cricket, they play ball, they play a lot of American games. And of course, they play some Indian games, and these children,they do have fun these children and you can really tell that they really, you know, yet in some of these they do learn something from half of the games they play. Cause in a lot of Indian games they play, the girls, a lot of Indians games they play are taught, they are taught from their parents and they do learn stuff. Yet their main games are baseball, cricket and ball, just American games, yet their ancestors did, as they go down from people to people, they are taught a lot of Indian games from their ancestors.

"What do these people eat?" Well, they grow their own crops and these people do eat a lot of vegetables, and they make their own homemade bread and many things like this. They make their own wheat from one special thing, they make their own, I think it's bread and it's from wheat and special things that you put into it. They eat barely, they don't eat barley, they make many things from barley. They have for dessert, they eat many American foods these people. They eat many American foods and they grow a lot of their things and it is almost all homemade, hardly any is imported. Yet some of the women do go to the store and buy desserts such as tarts and cookies and American foods. They buy desserts just as if they were in America and I think that that is almost, they have a high civilized, you know, a high civilized people and I think that what they eat is always nourishing cause they're not you know, not dirty like a lot of other Indians and they don't eat just what they see, they're not cannibals. These people eat a lot of American food and they enjoy desserts, American desserts.

And that's what I think. That's all that I,--I learned many other things, those are what I've learned mostly about La Stella.

Transcript: Fourth Grade Student "B"

I think a good business for La Stella would be well they could have a few factory for make good shoes for their feet so that they will not ruin their feet on something on the rocks and pebbles and the soil. And the second thing I think they should have a nice glove factory for when it gets very cold and the winter comes when they like to play out in the snow they should have gloves for their hands so they will not get frostbite. And for recreation I think they could have a Y.M.C.A. would be for all the people and the Y.W.C.A. for the women and a camp for the children. And the children would like to have other fun, they should have a pet shop and it would sell all kinds of pets for the children, so they can have pets to play with and have fun with. And if they want to make nice things out of, make nice foods they should have a flour factory to grind the wheat and make it into flour. And if they really want to have fun and see their own selves on television why don't they just start have a television studio and all the people could participate in it if they have the talent and things. And if you, some people have the talent to write, they like to write stories, and books and poems and I just happen to like stories, I love to read. So I think La Stella would have another good business is writers. And if they really want to protect their city against fires in the forest or the wheat catching on fire they could have a fire department. I think a fire department would be very handy in case of emergencies or just emergencies, in case of emergencies. And if they wanted to improve very much in their electricity then they could have oh electronics things to take care of in case, and the fire department would come in handy there if something happened to the electricity and wires caught on fire. And if the children really really wanted to have a lot of fun some of the older people who wanted their children to have fun they'd start a circus a nice circus for their children. And if the parents really wanted to have a good education for their children I think that they should have some teachers from other countries come over from wherever their country is and bring them over to La Stella and have them teach good manners and how to add out things if they have any problems with a if they wanted to be--And another thing they wanted to have an ability to do things they should teach them to be electricians. In La Stella I think all these jobs will come in handy because there are about four hundred people in La Stella so I think all of them would get a chance to do something out of it, in that particular city.

On very special occasions they have a special game called the chicken pole and I don't know much about that because all I have well really studied very much about that particular game because I was listening to a lot of other ones.

In La Stella they have electricity. They have enough electricity for electric lights. They have electric lights in most of the buildings except they don't have one in the medicine man's house. They have telephones, they have television sets, they have I believe they have heating, I'm not so sure about that.

In La Stella the weather it sometimes in summer gets warm nice and warm and then when it get in the fall its sort of chilly and then it snows in January and February then it begins to get warmer and then it is very warm again in the summer.

In La Stella they have schools for their children at the schools they have playgrounds in back of the schools. And the schools are made out of some kind of clay it's not brick but clay.

In La Stella they have a, they don't have any fire station that's why I mentioned fire station, but they have the governor's helper, I think that's what they call it---they call it some special name, who goes every day every week and he looks at around the whole village and then he goes down around the gates to make sure all the gates to make sure all the gates are safe and they are in good shape and sees how the houses are and helps fix up the houses so they don't really have police but they have some men who help to protect the country.

In La Stella they do work. The men do farming a lot of farming but the women they have they make cake and they make drums, cookies and bread and all sorts of things you can eat. And they also make as I said drums and they make beautiful pretty little boxes, metal boxes and they paint them all different colors. And that's what the women and men do.

Transcript: Fourth Grade Student "C"

I think someone in La Stella should start a trinket shop. He would make lots of money and people would come and buy things and they would like it. They would buy mocassins, beads, jewelry. The people in La Stella should have lots of businesses. They should make money to buy things instead of trading and there should be lots of businesses in La Stella, the people would make lots of money. Someone in La Stella should open a big store to buy clothes. They would make lots of money and I think people would come far away to make to buy stuff from a big clothes shop. They should open a bakery and sell cakes and donuts and that stuff because they make lots of money and people would like to eat that kind of food. The end.

This is what I learned about La Stella. Some people wear American style clothes. What can I say, what can I say. I learned that they have a baseball park there and that they play baseball.

They have round ovens with a hole in and they're outside and that's where they cook. There is a big hole in the ground and it's called a kiva and the people go there to celebrate religious. The children go to school like the children in America and they work there. And they have a church there where all the people go for religion. This is the end. Thank you for listening. Good-bye.

Transcript: Fourth Grade Student "D"

Hello, this is about farming. I think I think for a good business they could do farming because so they could raise cattle and from the cows they could get milk. And because they could get pork from pigs and they could have chickens and get eggs from them. And I think it would be a good business. And if it is a good business then a lot of people will have that and then they could sell the food to the store and the store could get food to sell to the people and some people would like to be a farm. But for farming you need a lot of work and a lot of equipment. I think it is good to be a farmer in La Stella because well La Stella is like a poor place and they could get a lot of money from being farmers. I think it would be a good job for the men to work on. Cows could give them their milk and chickens could lay eggs and it could turn out to be a good business. And then La Stella would turn out to be a rich house and they could build houses like ours and farming is good for the men to do, they could grow wheat in their house, and their houses would be just like the ones, and they could have big pastures and they could buy land and then have the farming to do and then and they could get they could get head from pork and they could eat the pork from the pig. I think it would be good to be a farmer and then the children that they have could help the farmer too. And they could have trees with apples and little boys and girls could come and pick up the apples.

Well farming would be good for La Stella because the farmer and it would be and they could have different kinds of food from the thing that they eat. And they could, well and they could do a lot of things when they are farming because I think men like to work. Farming is good for the men in La Stella to do because they could raise cattle and they could grow a lot of food like beans and stuff like that and there could be good pasture and they could they could could, they could have a lot of things to eat from from from it, from the chickens they could have eggs they could hatch eggs for chickens and they could bake the eggs and but you need a lot of equipment for this to do. La Stella would be a good and happy place. Your tape lesson is over.

In La Stella the kind of food that they eat is corn, beans. The kind of clothes that they wear is like ours a little but only in there it is a little hotter than ours and they have to wear like summer clothes. For work they take they do some things for people and carry them, um carry some things to the place where they have to go and they clean up the house and they work for their mother and father and they clean up the house.

The people make in La Stella bowls. The kind of things the kind of things that the people make in La Stella is, the mothers the mothers um they make bowls and they make bowls and bowls and the children make some little bowls. And they could go and find out something to do and make something.

The children play pretty much games as we do. They run around and play hide and go seek. For games the boys might play basketball and baseball and football and they even might play, might even play hide and go seek and the girls maybe would play get their friends and play school or house or playing with their dolls.

The people in La Stella make their house out of mud and the mud hardens and stuff like that. And maybe some houses are made different like some houses are made of?

The transportations that they have they might go on horses they might go on cars and they might go on carts.

The weather out in La Stella is like its sunny like and sometimes it rains, rains and sometimes it rains. But it is mostly sunny. Maybe it snows out in La Stella too. They have to wear like summer clothes because it is hot, mostly hot in La Stella. When it rains in La Stella they probably wear raincoats or hats.

Transcript: Fourth Grade Student "E"

This tape is about La Stella. The people need a living. They can't earn their money down at La Stella so they will have to start some business. I think a used car lot is very good for them because they can ride better and run faster than the horses. A clothes store is good too because so they won't make their own clothes and go through all that trouble. Now a food store is very very well. I know they catch their food but going to a food store in a car is very good like our state. Shoe stores are good for their feet. Their feet are very bare usually. They can they could wear them all around even in bed. A furniture is very good, so they can lay on couches, they can sleep on beds and they can play on trampolines or dresser I mean. Bead and belt stores are good down there, cause they like jewelry, very pretty jewelry too. Belts to put around their waists. Cleaners to clean their clothes. I know that seems very ridiculous in La Stella but it is not. Machinery store where they could build stuff like this and they can fix things up like this. A sports store so they can play baseball, basketball, volleyball any kind of ball, even soccor ball. A pet store is good for the children so they can go down and get their pets or what they want as a pet. Material store for the mothers. That is why she can make clothes for so she does not have to make them like she makes them out of hide. I know this tape is very very good. I am trying to study about La Stella.

La Stella is a little city in Washington. At La Stella they have very little horses down there. Sometimes the Indians sell drums or they can sell pottery or goods for the children or mothers or fathers. I mean that, what is a good business for La Stella, a little engine place. Well, I think what I just said is a very good place, a very very good place. La Stella, La Stella is a little place it does not have very many stores. It only has a couple. The people they earn their living selling stuff. This is very very good. They, after they sell the stuff and get their money, they can, they can buy jewelry, food, clothing, and beads or shoes. Well, the people in La Stella have not got them many stores, they they have very little food down there but they have much to eat when they want to. The harvest down there is business too. They have to sell the corn, they have to sell the peas, whatever they sell they have to get money for it. The horses down there are very weak and weary so that when the United States of America can find out what La Stella is they will see if they can fix it up. The food store is very very convenient. Well, when Indians go after cotton they cannot find any. They won't be able to eat so that is a very good reason. The shoe store is very good too so the Indians could wear boots, loafers, and anything that you wear on your feet. A furniture store is good too so they can sleep. A machine store before you were here a and a--that is what you will hear. The cleaners they must, the cleaners means they must have cleaners that clean their things. A pet store is good too so the vet can clip the dogs hair or the cats and give them collars.

Well La Stella is a nice place to live at. The business there is very slow and weary. This is a belt and bead store where people are living and buying----. The people there are buying what they need, they wish they had more stores than they got today. The material store is good too. It is like the clothes store but you have to sew sew the material. This is a very unique store where you can get your basketballs, baseballs and other things like soccor balls. The boys can get, the boys can get volleyballs down there and sell them. They can make like drums, yes, they make drums down there and they sell them. If they sell them they get a good price for them. The Indians have very little money and they have very little business too. The Indians are very good people. If the Americans like us can get these things that I am saying on this tape are very unique and expensive. If Americans do it the La Stella people will be happier and gayer.

Money is important for them. They can buy things at the store or anything. The La Stella people are very lonely people but they are very quiet people too. La Stella is a very quiet place and a very small place too. I wish that God would all bless these Indians. All these things that I said, I will say again, used car lot, clothes store, food store, shoe store, furniture store, belt and bead store, cleaners, machinery store. Well, bye bye.

Input and Output Variables: The Third Grade

The third grade students are examined separately because of the finding in the free inquiry task that the inquiry by the second grade students had been relatively meager. Hence the important question is whether there is any difference with respect to third grade students operating in the system. Table Twelve presents the input and output variables for the third grade in comparison with the fourth grade.

TABLE TWELVE

INPUT AND OUTPUT VARIABLES THIRD AND FOURTH GRADES: BUSINESS TASK

Variable	Grade 3	Grade 4	Difference	T-Test (Significance)
Question Asked				
Mean	5.606	6.259	0.653	1.021
SD	2.724	2.890		(NS)
Categories Searched				
Mean	8.484	10.963	2.439	2.612
SD	7.219	5.110		(.02)
Themes Generated				
Mean	5.909	6.692	0.783	0.812
SD	2.714	3.222		(NS)
Concepts Developed				
Mean	1.787	1.038	-0.749	1.213
SD	2.521	1.732		(NS)

In Table Twelve we can see that in terms of questions asked, themes generated and concepts developed, there were no significant differences between Grade Three and Grade Four. However, there were significant differences in terms of categories searched much as there were differences between Grade Four and Grade Six. Since the number of categories searched reflects the breadth of the questions asked, it would appear that the chief grade differences in this task related to the breadth of questions which were asked, which probably reflects the difference which we would expect between these grades in general intellectual development.

The most important finding in terms of the engineering of information systems for children is that the third grade children appeared to be generally able to handle the situation adequately in terms of the task, with no general pattern of differences such as we had found between the second and fourth grade children in the free inquiry task. In terms of the simple numerical asking of questions and generating of the themes descriptive of the culture, the original systems appear capable of supporting inquiry by the third grade. Individual differences, of course, were marked. Some of the third grade students asked as many questions and generated as many themes as any of the older children did, whereas some of the others carried on a bare minimum of activity. When one reads the tapes which were generated by the third grade, fourth grade and sixth grade students, one is much more impressed by within-grade variability than by between-grade variability. The protocols from all three grades seem to run the gamut in comprehensiveness of approach.

The Relationship Between the Input and Output Variables and the Characteristics of the Children

In Tables Thirteen and Fourteen, there are presented correlation coefficients for the input and output variables and the characteristics of the fourth and sixth grade students.

TABLE THIRTEEN

CORRELATION COEFFICIENTS:
GRADE FOUR:
BUSINESS TASK

	Correlation Coefficients						
Variable Descriptions	1	2	3	4	5	6	7
# Questions (1)	-						
# Categories (2)	.928**	-					

TABLE THIRTEEN (con't)

Variable Descriptions	1	2	3	4	5	6	7
	Correlation Coefficients						
# Themes (3)	.303	.323	-				
# Concepts (4)	.023	.004	.726**	-			
IQ (5)	.168	.168	.398	.158	-		
Parent's Occ. (6)	.291	.291	-.072	-.292	-.311	-	
Reading (7)	-.179	-.179	.141	-.032	.548**	-.222	-

** p=.01

TABLE FOURTEEN

CORRELATION COEFFICIENTS:
GRADE SIX:
BUSINESS TASK

Variable Description	(No.)	1	2	3	4	5	6	7
		Correlation Coefficients						
# Questions	1	-						
# Categories	2	.870**	-					
# Themes	3	.564**	.584**	-				
# Concepts	4	.509**	.557**	.643**	-			
IQ	5	.069	.115	.233	.181	-		
Parent's Occ.	6	-.001	-.181	-.343	-.213	-.264	-	
Reading	7	-.022	.100	.306	.162	.741**	-.365	-

** p=.01

The similarities and differences between the two correlation matrices are interesting. First of all in both the fourth and the sixth grades the input variables were correlated with each other, that is, questions and categories were highly correlated. The more questions a student asked, the more categories he was searching. The coefficient in one case was not .928 and on the other case .870. Also the output variables were correlated with each other in both grades and again the correlations were high. In Grade Four the correlation was .726 and in Grade Six the correlation was .643. Also in both grades Reading Achievement and IQ were very highly correlated which is not unexpected.

Also, although the coefficients did not reach the point of significance, the trends in the correlations between parent's occupation and reading was a negative trend which follows the familiar pattern of social status bearing a relationship to reading ability.

The striking difference between the two grades relates to the relations between the input and the output variables. In the fourth grade, neither input variable was correlated with either output variable, although the trend was in that direction with the coefficients being in the order of .3. In the sixth grade, however, the correlations reached significance at the .01 level, with questions and categories being correlated significantly with themes and concepts. All four correlation coefficients for the sixth grade were between .5 and .6.

The relationship between input and output is one which requires much investigation. Since the student's exposure to information is directly related to the number of questions he asks, it should be possible in the setting of the data storage and retrieval systems to devise a number of studies to enable us to explore precisely the relationship between information input and information output when students are engaged in tasks relative to cultures they have not studied. By setting up tasks which have many steps each of which is contingent on certain types of information input, we should be able to devise investigations in this area. For the present, it is worth noting that input and output seem to be somewhat related to each other but not completely and that the relationship exists most strongly at the sixth grade level but does not appear to be very strong, if it exists at all, at the fourth grade level. It may be that the sixth grade students have more fully developed information processing systems so that when the time comes for them to terminate the tasks and they are seated before the tape recorder making their report in the form of a lesson to another child or report on a good business to start in the culture, their information processing system turns on the input they have received and releases it to the magnetic tape. An alternative explanation is that the sixth grade student, being more socialized to school than the fourth grade student, may feel it incumbent upon him to unburden himself of all the information he has taken in, or as much as he can, which the younger children may simply go about the task with less concern that they demonstrate what they have learned. In any event, the relationship between input and output deserves considerable investigation.

The Content of Input and Output

Table Fifteen provides a frequency distribution of the categories which were searched by the third, fourth and sixth grade students during the business task. It is worthwhile noting that while there are some differences in the profiles for the grades, they are remarkably similar. The content of input varied very little from grade to grade. In fact one of the striking features of the data from the free inquiry task was that we were unable to detect an increasing sophistication from grade to grade. True, from grade to grade the width of questions asked was reflected in the number of categories searched. But we were unable to find differences in pattern or sophistication that would indicate that the sixth grade students had a more analytic strategy for solving the business task than did the students from the earlier grades. In general, this finding is in accord with previous findings from studies of children's social concepts, which indicate gradual increments of information and concepts through the years, but no increases that could be traced to the teaching of analytic strategies by the schools.

The finding in the free inquiry task that the older children tended to search more intangible aspects of the culture did not repeat itself during the business task, perhaps due to the nature of the task, which dealt with, after all, the more material aspects of the culture.

TABLE FIFTEEN

BUSINESS-FREQUENCY DISTRIBUTION OF CATEGORIES SEARCHED

	Category Name	Grade 6	Grade 4	Grade 3
13.	Geography	18	13	4
14.	Human biology			
15.	Behavior processes and personality	1		1
16.	Demography	6	3	1
17.	History and culture change	1	1	4
18.	Total culture			
19.	Language	3	2	5
20.	Communication	5	2	2
21.	Records			
22.	Food Quest	6	2	6
23.	Animal husbandry	8	2	2
24.	Agriculture	11	1	8
25.	Food processing	1		
26.	Food consumption	13	18	16
27.	Drink, drugs, and indulgence	1		
28.	Leather, textiles, and fabrics	5	6	4
29.	Clothing	21	22	22
30.	Adornment	4	4	3
31.	Exploitative activities	1	2	4
32.	Processing of basic materials	5	6	3
33.	Building and construction	5	3	5
34.	Structures	15	11	16
35.	Equipment and maintenance of buildings	5	8	2
36.	Settlements	1	1	
37.	Energy and power		3	4
38.	Chemical industries			
39.	Capital goods industries			
40.	Machines	5	2	3
41.	Tools and appliances	4	3	7
42.	Property			
43.	Exchange	8	6	8
44.	Marketing			
45.	Finance			
46.	Labor	12	4	7
47.	Business and industrial organization	3		
48.	Travel and transportation	18	8	8

TABLE FIFTEEN (con't)

	Category Name	Grade 6	Grade 4	Grade 3
49.	Land transport	10	7	6
50.	Water and air transport	3	2	
51.	Living standards and routines	4	6	4
52.	Recreation	10	12	10
53.	Fine arts	1	6	9
54.	Entertainment	2	2	2
55.	Individuation and mobility			1
56.	Social stratification			
57.	Interpersonal relations		1	4
58.	Marriage		1	
59.	Family			2
60.	Kinship			
61.	Kin groups			
62.	Community	3	4	1
63.	Territorial organization			
64.	State			
65.	Government activities	6	6	3
66.	Political behavior			
67.	Law	1	1	
68.	Offenses and sanctions			
69.	Justice			
70.	Armed forces			
71.	Military technology			
72.	War	1		5
73.	Social problems			1
74.	Health and welfare	3	2	3
75.	Sickness	7	2	4
76.	Death			
77.	Religious beliefs	7	3	2
78.	Religious practices	7	3	1
79.	Ecclesiastical organization	1	1	
80.	Numbers and measures			
81.	Exact knowledge			
82.	Ideas about nature and man			
83.	Sex			
84.	Reproduction			
85.	Infancy and childhood	2		4
86.	Socialization			
87.	Education	15	9	10
88.	Adolescence, adulthood, and old age			1

The Kind of Businesses the Children Would Begin

A partial list follows of the kind of businesses that the students felt should be started within the pueblo. Their selections ranged all the way from shrewd analyses of the kinds of things that would capitalize on their situation to a general social concern reflected in a desire to start businesses that would not necessarily have a high rate of profit (hospitals) to a concern for the kinds of things they would like to have themselves (as a pet store). Nearly all of the children's selections, however, as indicated in the protocols reported earlier, reflected the culture of the pueblo and its particular economic situation. While the students did not seem to have any type of formal strategy, such as one might derive from economics for hunting for an appropriate business to begin, they approached the task with general common sense and their recommendations are not very different from those which have in fact been made by consulting firms employed by the pueblo to make recommendations for the economic development of the community.

TABLE SIXTEEN

SIXTH GRADE
FREQUENCY DISTRIBUTION OF BUSINESSES THEY WOULD START

Category Name	
1. Building houses	2
2. Farming	5
3. Bus transportation	5
4. Government work	1
5. Teaching	2
6. Community college	1
7. Tool store	1
8. Trading post	1
9. Department store	4
10. Bricks and wood for construction	4
11. Doctor	4
12. Hospital	3
13. Building corporation (for better houses)	1
14. Selling things for horses	2
15. Hunting	1
16. Selling food (store)	4
17. Weapon making	1
18. Pet store	1
19. Appliance store	2
20. Furniture store	1
21. Sports equipment	1
22. Books, pencils, batteries	1
23. Sell better stoves	1
24. Laundromat	1
25. Restaurant	1
26. Basket making	1
27. Pottery	2
28. Jewelry	1
29. Rubber industry	1
30. Gas station	1
31. Leather	2
32. Clothing store	4
33. Pool making	1
34. School master	1
35. Nurses	2
36. Agricultural expert	1
37. School	2

TABLE SIXTEEN (con't)

SIXTH GRADE
FREQUENCY DISTRIBUTION OF BUSINESSES THEY WOULD START

Category Name	
38. Classes for sewing	1
39. Weaving	1
40. Farm machinery	1
41. Used cars	3
42. Airport	2
43. Tourism	1
44. Sports activity	1
45. Baseball team	1
46. Bank	2
47. Machines	2
48. TV and radio	1
49. Architect	1
50. Road building	1
51. IBM	1
52. Factory store	1
53. Weather station	1
54. Trains	1
55. Ship building	1

TABLE SIXTEEN (con't)

FOURTH GRADE
FREQUENCY DISTRIBUTION OF BUSINESSES THEY WOULD START

Category Name	
1. Food market	8
2. Bicycle store	1
3. School for teenagers	1
4. Making food products	1
5. Furniture	2
6. Baked products	2
7. Sell cattle	1
8. Farming	4
9. Equipment for farming	1
10. Library	1
11. Stores for clothing	5
12. Equipment for schools	1
13. Used car lot	1
14. Shoe store	1
15. Beads and belts	1
16. Machinery store	2
17. Sports store	1
18. Pet store	2
19. Material store	1
20. Engine store	1
21. Shoe factory	1
22. Glove factory	1
23. YMCA	1
24. Camp	1
25. Fire department	1
26. Circus	1
27. Teachers from other countries	1
28. Electricians	1
29. Making clothes	2
30. Materials gathered on trips	1
31. Trinket shop	2
32. Chicken and eggs	1
33. Janitors	1
34. Construction company	1
35. Banking	2
36. Restaurant	1
37. Sale of pottery	1

TABLE SIXTEEN (con't)

FOURTH GRADE
FREQUENCY DISTRIBUTION OF BUSINESSES THEY WOULD START

Category Name	
38. School	1
39. Circus	1
40. Wood for housebuilding	2
41. Store for ladies	1
42. Telephone business	1

TABLE SIXTEEN (con't)

THIRD GRADE
FREQUENCY DISTRIBUTION OF BUSINESSES THEY WOULD START

Category Name	
1. Shows for tourists trade	1
2. Company for making drums	2
3. Baked goods	2
4. Farming	3
5. Furniture factory	2
6. Clothing factory	4
7. Food factory	1
8. Public library	3
9. Barber shop	1
10. Secretaries for typing	1
11. Crafts	1
12. Building houses	3
13. Building water to the people	1
14. Airport	1
15. Selling clothes	3
16. Telephone	1
17. Pottery	1
18. Engineering (like driving a bus or train)	1
19. Doctor	1
20. Grocer	5
21. Furniture	1
22. Games	1
23. Building stores	1
24. Selling guns	1
25. Buses	1
26. Horses and sheep	1
27. Making things to sell to other people	1

The Relationship Between the Free Inquiry Task and the Business Task

It may be recalled that during the pilot study there seemed to be considerable difference between the performance of students in the free inquiry and the business tasks or tasks which appear similar to them (the free inquiry tasks represent an extremely open-ended task which presents very few constraints to the student whereas the business task represents a somewhat more structured task which still presents quite a bit of latitude for student choice of direction). In Table Seventeen there is presented a comparison of the input and output variables for the two tasks for Grade Six and Grade Four.

TABLE SEVENTEEN

COMPARISON OF INPUT AND OUTPUT VARIABLES FOR THE FREE INQUIRY AND BUSINESS TASKS

Variable			Free Inquiry Task	Business Task	Difference	T-Test (Sig.)
Grade Six	#Questions					
		M	8.833	7.091	1.742	2.384
		SD	3.146	3.136		(p=.02)
	#Categories					
		M	14.214	13.667	0.548	0.416
		SD	5.163	6.243		(p=1.000) Approx.
	#Themes					
		M	10.714	6.727	3.987	4.229
		SD	4.032	4.079		(p=.001)
	#Concepts					
		M	2.190	1.727	0.463	0.944
		SD	2.155	2.050		(p=.34)
Grade Four	#Questions					
		M	8.229	6.333	1.895	2.573
		SD	2.891	2.855		(p=.01)
	#Categories					
		M	10.743	11.037	-0.294	-0.240
		SD	4.598	5.034		(p=1.000) Approx.
	#Themes					
		M	12.429	6.346	6.082	4.067
		SD	7.237	2.741		(p=.001)
	#Concepts					
		M	3.371	0.769	2.602	3.345
		SD	3.812	1.243		(p=0.001)

It should be remembered that the two studies were carried out with matched groups for both the fourth and sixth grades so findings are not likely to stem from general differences between the samples. The two patterns of differences are very similar for both the fourth and the sixth grades. Fewer questions were generated during the business task. The number of categories, however, was about the same, reflecting a somewhat greater width of questions during the business task. The number of themes generated was much greater for the free inquiry task than for the business task, when the students were dealing with the criterion of finding good businesses to start there. For the sixth grade the number of concepts generated was not dissimilar for the two tasks, but it was for the fourth grade with many fewer concepts being generated during the business task. Intelligence, Reading Achievement, and parent's occupation did not significantly affect results in either of the tasks, indicating that neither of the tasks was more suited to children described in terms of those variables. In Chapter Thirteen, we would report a study of children's preferences for test structure in which we attempt to identify which kinds of children performed at a higher level in one task under one set of task conditions and under the other, although certain difficulties in the design of the study prevented us from getting a clear answer to that question.

At this point, it seems safe to conclude that the free inquiry task results in a generally higher quantity of questioning and a greater generation of descriptive themes than did the somewhat more highly more structured test. However, this difference should not be interpreted to mean that somewhat structured tasks should not be used in instructional systems implying information systems. By focusing inquiry, structured tasks may serve quite a wide variety of purposes. However, the results suggest that structure or task focus is a variable with respect to the inquiry of the children and needs to be taken into account as instructional systems are constructed.

Summary

Most third, fourth, and sixth grade children were able to respond to the "business task," with grade differences being small--only"categories searched" being significantly different between grades. The content of questions asked was similar from grade to grade, with fewer questions exploring intangible aspects of culture than was the case in the "free inquiry" task. The patterns of questions were similar (students tended to begin with geography, move to physical descriptions of clothing, housing, etc., and then branch out). Content of "themes generated" and "businesses suggested" was similar for all grades.

As in the free inquiry task, output was not very conceptual, nor did conceptuality of content appear to increase by grade, once again underlining the importance of research into the teaching of conceptual systems to children. In the same vein, the children manifested no particular strategy for examining the economics of the community and deciding on a business. Yet, a fair number of the businesses they recommend were among those recommended by private and governmental agencies for the improvement of the Pueblo economic situation.

As in the "free inquiry" task, input and output were significantly related for the sixth grade but not the fourth. The need for more specific research into patterns of information procurement and use is very great.

Neither input nor output was related to IQ, academic achievement, or parent's occupational status for any grade.

The business task elicited fewer questions but not fewer categories, fewer themes and (for grade four) fewer concepts than did the free inquiry task. Possibly task focus can be used to shift inquiry focus, perhaps into desired areas of cultural activity. This possibility is explored explicitly later in the report.

CHAPTER SEVEN

THE THIRD STUDY: GROUPS IN ACTION: THE EFFECTS OF THE "QUESTION STIMULATOR"

This investigation was conducted in an effort to explore the effects of two independent variables on the inquiry of students in a task requiring them to compare two cultures. The study took place in a setting which included the "La Stella" storage and retrieval system based on the pueblo culture and the "Prestonport" system, which was based on a New England town. The task asked the students to attempt to compare and contrast the two cultures. The design of the study permitted the investigation of two independent variables. One was group composition. The investigation organized the students into groups which were made up in terms of performance on the free inquiry task. The second was the effects of a "question stimulator", which was a self-administering tape-slide instructional unit designed to teach the students some of the questions that social scientists use when they are comparing various aspects of cultures. The investigation thus adds three elements to the studies reported in the earlier chapters. One is the performance of the students in cultural comparison tasks. The second is the effects of the question stimulator. The third is the behavior of the students when they work in groups of known composition as they withdraw and utilize information from the data storage and retrieval systems.

Design

The design of the study is as follows. All of the subjects for the fourth and sixth grade samples are drawn from the free inquiry task and they were all students who had completed the free inquiry task. The students were divided into groups of three according to the following pattern. Some of the groups were "high searchers", that is, students who had asked a great many questions during the free inquiry task. Second, some of the groups were "low searchers", that is students who had asked very few questions in the free inquiry task. Third, some of the groups were mixed, that is, one high searcher was paired with two low searchers. Last, some of the groups consisted of "average searchers" or people who had clustered around the mean of the free inquiry task. Hence, within each grade, there were four groups which we will call high searchers, low searchers, mixed searchers, and average searchers. In addition, the groups were matched and assigned randomly to two treatment units. One treatment unit received the question stimulator prior to engaging in the cultural comparison task. The remainder simply proceeded with the task.

In addition, third grade students engaged in the cultural comparison task as individuals, but they were divided into two matched groups, one group of which received the question stimulator prior to engaging in the cultural comparison task.

By dividing the students into groups, we reduced sample size to the point where some comparisons cannot be made with confidence. On the other hand, it seemed very desirable to observe how youngsters would utilize the systems as they worked in groups and to make a determination of the kinds of adjustments that might be necessary in order to prepare information systems that would adequately meet the needs of groups as well as individuals. Also, it is important to get some notion about what happens to a high searcher when he is paired with low searchers, and vice versa, so that we can begin to formulate investigations to pin down the effects that individuals have on each other with respect to information retrieval and usage and with respect to their patterns of interaction. Hence, we developed the rather clumsy design which probably attempted too much, but which resulted in a considerable yield of ideas which need to be investigated one by one.

The Effects of the "Question Stimulator"

The data collected during the study were similar to those collected during the free inquiry task and the business task. The number of questions and categories were recorded and analyzed for content. The groups made tapes comparing the two cultures at the conclusion of the task and these were analyzed in terms of themes and concepts.

In general, the results indicate that students were able to take hold of the cultural comparison tasks. They asked questions, withdrew information from the two data storage and retrieval systems, and attempted to put those data together and draw conclusions about similarities and differences within the two cultures. Requests for aid were relatively few. In fact, aid-given was of extremely low frequency, compared with tasks in which students worked alone, evidently because if one student had difficulty in finding slides he could turn to his peers rather than to the attendants. As will be seen presently, cultures were compared on many different grounds. For strictly engineering purposes, it is worth noting that all three of the tasks: the free inquiry task, the business task, and the cultural comparison task, presented to students through self-instructional tape-slide units, appeared to be possible with the children. That is, after simply administering the orientation units to themselves, and then the task presentation units, students were able to begin work and were able to work together till the conclusion of the tasks, with a small amount of help from attendants. Although the matter needs further investigation, it would appear that data storage and retrieval systems of this type, combined with self-administering orientation materials and task presentation units, can provide children with a relatively autonomous learning environment.

Table Eighteen presents data comparing the means of the groups which received the question stimulator and those that did not receive the question stimulator with respect to the input and output variables.

TABLE EIGHTEEN

GROUPS RECEIVING AND NOT RECEIVING THE QUESTION STIMULATOR: COMPARISON OF MEANS OF INPUT AND OUTPUT VARIABLES
(Grades Four and Six)

	With Question Stimulator	Without Question Stimulator	Difference	t Value (Significance)
Questions Asked				
M	7.30	5.80	1.50	1.869 (p=.10)
SD				
Categories Searched				
M	18.66	13.63	5.03	2.531 (p=.05)
SD				

TABLE EIGHTEEN (con't)

		With Question Stimulator	Without Question Stimulator	Difference	t Value (Significance)
Themes Generated					
	M	11.41	15.27	-3.86	-0.663 (NS)
	SD				
Concepts Developed					
	M	4.08	4.54	-0.46	-0.076 (NS)
	SD				

It can be seen that there was a significant difference in categories searched and a nearly significant difference in number of questions asked in favor of the groups which received the question stimulator. There were no significant differences with respect to the output variables although themes generated showed very high variability and a non-significant difference in means in the direction opposite to that which was expected.

The question-stimulator was tested as a crude prototype of self-administering instructional systems which could be used in combination with the data banks to help teach students how social scientists go about cultural analysis. The results here encourage further exploration in the development of such systems and this topic will be looked at again later when we consider the effects of the self-administering system to provide students with practice in the solution of cultural problems and to stimulate them toward more productive thinking with respect to cultural problems (Chapter Ten).

In Table Nineteen a comparison is made of the themes which were generated by the students in terms of the broad Area File categories. About 150 were classified from the fourth grade sample in order to produce Table Nineteen. It can be seen that there was no outstanding effect of the culture model on the content of themes. The group receiving the culture model generated about the same kind of themes. They simply asked more and broader questions,

TABLE NINETEEN

COMPARISON OF THEMES GENERATED BY GROUPS RECEIVING AND NOT RECEIVING THE QUESTION STIMULATOR

Themes Generated	With Question Stimulator	Without Question Stimulator
Geography		
Location	2	1
Climate	2	2
Topography	3	1
Fauna		1
Demography		
Population	5	1
Composition of Population	3	2
Immigration and Emigration	1	
History and Culture Change		
Historical Reconstruction	2	
Language		
Special Languages		1
Communication		
Press		1
Telephone and Telegraph	1	
Food Quest		
Hunting and Trapping	5	4
Fishing	3	3

TABLE NINETEEN (con't)

Themes Generated	With Question Stimulator	Without Question Stimulator
Animal Husbandry		
Domesticated Animals	2	2
Agriculture		
Tillage		2
Agricultural Science	5	3
Vegetable Production	2	
Forage Crops	2	2
Food Consumption		
Diet	7	6
Food Service Industries	5	2
Leather, Textiles, and Fabrics		
Leather Industry	2	1
Textile Industries	2	
Clothing		
Normal Garb	9	8
Special Garments	3	3
Paraphernalia	1	3
Clothing Manufacture		1
Adornment		
Ornament	1	1
Processing of Basic Materials		
Ceramic Industries		3
Smiths and Their Crafts	1	

TABLE NINETEEN (con't)

Themes Generated	With Question Stimulator	Without Question Stimulator
Structures		
Architecture		3
Dwellings	10	12
Outbuildings	1	
Religious and Educational Structures	5	6
Business Structures		1
Equipment and Maintenance of Buildings		
Furniture		3
Interior Decoration	3	5
Settlements		
Parks	1	
Energy and Power		
Electric Power		1
Capital Goods Industries		
Shipbuilding	1	
Machines		
Industrial Machinery		1
Agricultural Machinery	1	
Tools and Appliances		
General Tools	1	
Marketing		
Retail Businesses	1	

TABLE NINETEEN (con't)

Themes Generated	With Question Stimulator	Without Question Stimulator
Labor		
Occupational Specialization		1
Labor Supply and Employment	5	3
Wages and Salaries		1
Business and Industrial Organization		
Ownership and Control of Capital		1
Individual Enterprise	1	
Cooperative Organization	2	
Travel and Transportation		
Transportation	8	9
Water and Air Transport		
Boats		1
Airport Facilities		2
Air Transport	2	
Living Standards and Routines		
Leisure Time Activities		1
Recreation		
Hobbies	2	1
Games	3	1
Athletic Sports		2
Rest Days and Holidays	3	3
Recreational Facilities	5	2
Fine Arts		
Dancing	1	1

TABLE NINETEEN (con't)

Themes Generated	With Question Stimulator	Without Question Stimulator
Entertainment		
Motion Picture Industry	1	
Social Stratification		
Classes	1	4
Interpersonal Relations		
Friendships	1	
Marriage		
Mode of Marriage		2
Community		
Local Officials	1	
Police	1	
Sickness		
Preventive Medicine		1
Medical Care		1
Medical Personnel		1
Death		
Mourning	1	1
Cult of the Dead	1	
Religious Beliefs		
General Character of Religion	5	3
Spirits and Gods	3	

TABLE NINETEEN (con't)

Themes Generated	With Question Stimulator	Without Question Stimulator
Ecclesiastical Organization		
Organized Ceremonial	2	
Infancy and Childhood		
Child Care		1
Childhood Activities	2	
Socialization		
Transmission of Beliefs		1
Education		
Educational System	6	5
Elementary Education	1	
Vocational Education	1	

but the content they reported did not vary appreciably. It is worth noting that the children compared the cultures on the same bases they had used in the free inquiry and business tasks. The tangible, surface aspects of cultures predominated at all grades.

TABLE TWENTY

GROUP COMPOSITION AND MEANS OF INPUT AND OUTPUT VARIABLES IN CULTURAL COMPARISON TASK (Grades

	Questions	Categories	Themes	Concepts
High Searchers (4 Groups)	8.3	23.5	15.5	8.0
Low Searchers (4 Groups)	5.7	9.7	13.0	2.75
Mixed Searchers (3 Groups)	5.3	14.3	11.7	1.30
Average Searchers (12 Groups)	6.4	16.6	12.9	4.3

The Groups at Work

It would be recalled that in the design of the study the students were divided into 23 groups of three children each. Four of the groups were students who had previously been "High Searchers" on the free inquiry task, four groups were composed of students who had been "Low Searchers" in the free inquiry task, three groups included one high searcher and two low searchers, and the remainder of the groups were students who had been around the medium numbers of questions and categories searched during the free inquiry task. In Table Twenty the means of the input and output variables are presented for the four groups. No statistical comparison is made because of the very small size of the group and the very large number of factors which might have resulted in differences.

We would, of course, make the prediction that the high searchers working together would exceed the other groups and it appears that they did so. The conceptual content of their output is especially interesting, not only because it is so much greater than the other groups, but because it was so much higher than individuals produced alone in their descriptions of the Pueblo. These four groups of students, discussing questions, retrieving information, deciding on the cultural comparisons to make, produced by far the most conceptual output of any identifiable collection of students in all the series of studies.

The other three types of groups seem to be about equal which stimulates us to wonder whether the low searchers, in particular, did not benefit from working in groups rather than as individuals. The three groups of mixed searchers did not seem to show the effect of having a high searcher among them, and it is worth noting that the conversation during the group sessions did not reveal that the high searcher dominated his peers or played a more prominent role in the group than the youngsters who had been low searchers on previous occasions.

The groups were observed as they engaged in their inquiry during the cultural comparison task, and an attempt was made to judge the extent to which the groups engaged in debate over issues, the extent to which they discussed alternatives while making their output tape, and the extent to which one child dominated the group. Many teachers had suggested to us that in this kind of situation, one child would really take over for the others.

This did not prove to be the case at least from our observation. In four of the 24 groups, it was judged that a single child tended to dominate the group and to work his will on the situation irrespective of the wishes of the others.

Debate was a marked characteristic of about half of the groups with about 12 of them engaging several times in debate over the questions that they would ask and the ways they would use information in making the comparison between the two cultures. In no case did the debate need to be settled by the intervention of an adult. We felt, however, that the rather quiet, businesslike, technological-seeming atmosphere of the laboratory was responded to by the children who attended the business most of the time. Dialogue is, of course, difficult for the youngsters and no help was provided to them. However, in eleven of the groups there was some serious discussion over the nature of the cultural comparison and discussion was made of the value of the differences. Several of the groups were struck by the difference in style of life between the New England town and the Pueblo and in their own childish way they discussed the merits of the two different life styles and the implications for their own lives.

We are encouraged to believe that it is quite possible to build instructional systems in which groups of children study questions and problems some of which are posed to them externally and some of which they generate themselves, but under conditions in which debate and dialogue are important.

Considerable study is needed of the kinds of help that can be provided to children to enable them to engage in dialogue more effectively, of the effects of group composition, and ways of helping them develop their own leadership.

Apparently, there was no relationship between the question stimulator and the amount of dialogue or debate.

The Third Grade

The above investigation was conducted also with 30 third grade students, half of whom received the question stimulator prior to their inquiry. The results indicate that the culture stimulator had no effect at the third grade level, although the children reported that they enjoyed it. The input and output variables for each treatment group, the content of the questions asked, and the themes generated were almost identical with that among the older children.

Apparently, the third grade students were able to handle the cultural comparison task. They generated from five to thirteen questions "a piece" in attempting to solve the task and they produced an average of almost ten themes a piece as they compared and contrasted the cultures as many as several of the groups of older children. Their approaches were also remarkably non-conceptual. As in the case of the fourth and sixth grade students, they made the cultural comparison on about the same basis as the children engaging earlier in the free inquiry task or the business task had described the Pueblo culture. That is, concepts relating to the tangible aspects of the culture: housing, clothing, geography, dominated in comparison with those having to do with behavior processes, personality, social status and other intangible aspects of cultural behavior.

Summary

In this chapter we have described an extensive study in which 23 groups of three fourth and sixth and thirty third-grade children were presented with the task of comparing two cultures, each one of which was represented by an information system. About half of the groups of students first administered to themselves a self-instructional unit which describes some of the types of questions that social scientists use when they study cultures. This unit was referred to as the "question stimulator." The results indicate that third, fourth, and sixth grade students were able to handle the cultural comparison task, that is, they were able to seek cultural information and to make comparisons of life in the two communities.

As in the case of the free inquiry and business task, they tended to concentrate on the more tangible aspects of the culture to the neglect of the less tangible aspects. This was true whether or not the students had received the "question stimulator." The question stimulator itself apparently affected the number of questions asked and the number of categories searched for the fourth and sixth grade students who received it. Due to its effect, and the fact that it was enjoyable by the students, we are encouraged to believe that it is worthwhile to build and test self-instructional systems to stimulate children's inquiry. If such a simple system should show promise, a more powerful and complex system should yield considerable effect.

With respect to the operation of the groups, it was noted that very few of the groups were dominated by one child and nearly half of the groups were able to engage in debate and dialogue with respect to the cultural comparisons that they were making.

Again, we are encouraged to believe that groups of children can be taught to handle many aspects of the cultural inquiry and that they can run a considerable proportion of their activity themselves. We are also encouraged to believe they can be taught successfully how to debate significant issues and that they can do this with moderate amounts of adult leadership.

The composition of the groups determine according to their performance on the free inquiry task earlier. Groups who had been "high searchers" in the free inquiry conditions turned out to be high searchers also when they operated as groups and when their performance was compared with that of other groups of children who had performed differently on the free inquiry task. Group composition may be an important variable and should be studied within the rather precisely defined perimeters of the data storage and retrieval systems to develop guidelines for the creation of effective self-instructional groups.

CHAPTER EIGHT

THE FOURTH STUDY: "STUDENT INQUIRY" VERSUS "SYSTEM INITIATION"

One of the most interesting questions in educational methodology and one of the most difficult to pin down has been the effects on learning that result from student-directed inquiry as compared to inquiry which is controlled by forces external to the learner. For many years, there have been many advocates of student-centered learning and many advocates of teacher-directed or system-directed learning. Yet, it has always been exceedingly difficult to design investigations to compare the effects of student-directed learning with those of externally-directed learning. Nearly all of the research has been equivocal and to this point there does not seem to be a systematic pattern of findings which would lend much comfort to either camp. (See Shulman, 1968, for an excellent review.) One of the chief difficulties in conducting investigations which compare the two general educational "methods" has been that truly learner-centered inquiry takes students in all directions and it is very difficult to figure out how to measure the outcomes of their learning. How do we compare, for example, a student who inquires into the city government of New York by reading the speeches of the mayor and talking to voters, politicians, and acting officials with a student who is led through the study of the government of New York via a textbook? We can give a test on the material in the textbook, but how do we identify the other material or decide what a student should have learned from it?

David E. Hunt, Professor of Psychology at the Ontario Institute for Studies in Education suggested to us that we use the data storage and retrieval systems as a setting for studying certain limited aspects of the student-centered versus system-centered educational problem. With his help, we created the following research design.

Design of the Study

The subjects for the study were third and fifth grade students. Actually, two studies were conducted, one with the third grade, and the other with the fifth grade. Twenty students from each grade were divided into two sub-groups consisting of pairs of subjects who were matched by IQ and the level of parent's occupation. Thus in each grade, we have two groups. Group I, which we will refer to as the learner-directed group, engaged as individuals in the free inquiry task precisely as it is reported in Chapter Five. The second group, working as individuals, were given the free inquiry task, but instead of proceeding to ask their own questions, each one received the slides and tapes which had been requested by his mate in the other group. The second group we will refer to as the system-directed group. In other words, the members of the student-directed group engaged in the free inquiry task asked their own questions in their own pattern. Their mates in the system-directed group simply received the material that had been withdrawn by their matched mate. The individuals of both groups, however, made the output tapes as usual, describing the pueblo as they would try to teach about it to another child.

The output tapes were coded in the usual fashion and the focus of the study is on the themes generated by the two groups. The question which we are interested in is does learner or system initiation result in a different quantity or content of output?

The Results of the Study

In Table Twenty-One the means of the learner-directed and system-directed groups are compared for each grade with respect to the number of themes generated.

TABLE TWENTY-ONE

MEANS OF THEMES GENERATED BY LEARNER-DIRECTED AND SYSTEM-DIRECTED STUDENTS

		Learner Directed	System Directed	Diff.	t Value (sig.)
Third Grade	M	9.7	11.6	1.9	2.36 (p=.05)
	Range	6.9	16		
	N	10	10		

TABLE TWENTY-ONE (con't)

		Learner Directed	System Directed	Diff.	t Value (sig.)
Fifth Grade	M	11.2	12.5	1.3	1.57 (NS)
	Range	14	16		
	N	10	10		

The mean number of themes generated by the system-directed group of third graders exceeded the mean number of themes generated by the learner-directed third graders to an extent which was statistically significant at the 5 percent level. The apparent difference at the fifth grade level was in the same direction but the difference did not reach significance. Although both groups received the same input, advocates of student-initiated learning would have predicted that the learner directed group would have exceeded the system-directed group in both cases because they would be more in control of their reception of material--they could ask their own questions in any order that suited them. Perhaps the process of retrieval, being more complicated for the learner-directed group, reduced their retention of material. Or possibly the system-directed group was placed in a situation much more like the school situation they are accustomed to as receptors of information, and when the time came to make their output tape perhaps they felt they should recall everything possible to show how much they had learned. Or possibly learner initiative is really not, for many students, as important as often is assumed. By repeating this type of study under different task conditions and by examining information utilization more precisely, we should be able to probe more deeply into this problem area.

The groups were too small to make meaningful comparisons with respect to intelligence and other factors, but the pattern of correlations of intelligence with questions, categories and themes were very similar to those reported in Chapters Five and Six. That is, intelligence and socio-economic factors did not seem to affect performance in the system nor did they appear to interact with the treatments.

This investigation was done to demonstrate the possibilities for research within the data storage and retrieval systems when we wish to have more precise controls over such factors as learner and system initiation than has hitherto been possible. It should be possible for us to generate a long series of investigations to find out what kind of students learn the most under conditions which they control themselves or conditions of external control, what kinds of output are or are not related to learner and system direction, and perhaps even investigations should lay on the old controversy of learner-centered education. So far as the first investigation results are concerned, we have to conclude that system direction appears to result in more output at the third grade level and, while the level of significance at the fifth grade level is not acceptable, the results were suspiciously in the same direction as they were at the third grade. Certainly the learner-directed activity did not exceed the system-directed activity as many people would have predicted.

An investigation of the content of the themes generated was done, but the details are not reported here, because the finding is almost exactly as was reported in Chapter Five for the larger free inquiry study and there was no difference at all between the groups.

CHAPTER NINE

THE FIFTH STUDY: VALIDATION OF SOCIAL SCIENCE CONCEPTS

One of the important potentials for informational support systems in the social studies is their use as settings in which children can learn concepts and modes of inquiry from the social sciences. Can children learn ideas from the social sciences while they study the cultures represented in the information systems, and if so, what ideas? Can they develop their own modes of inquiry? If information systems can bring to children a broad spectrum of data about significant aspects of culture and cultural problems, can they also explore the intellectual processes of the social sciences?

In the present study we began what will be a long series of investigations to explore whether and how children can find examples of social science concepts by searching in the information systems. It also represents the first in a long series of investigations to explore the kinds of concepts that children can investigate, and what individual differences exist with respect to their ability to validate social science concepts.

The essential design of the study was very simple. A series of seven social science concepts were identified from Berelson and Steiner's Human Behavior: An Inventory of Scientific Findings. The concepts were selected according to the following criteria: First, only those concepts were selected to which information from the data storage and retrieval systems pertained. That is, information relative to the concepts could be found through inquiry into the data storage and retrieval systems. Second, we identified the concepts along a continuum of what we conceive to be "complexity," that is, we tried to have some fairly simple concepts and some fairly complex ones.

An example of a simple concept is: "All societies have marriage and families, that is, every society has some way that adults can get together and have children and raise them." This concept was construed to be fairly simple because marital forms are fairly easy to detect. They are extremely prominent in a society. They have many manifestations that are tangible as well as intangible. Their major features, as well as being easily discernable, are few and distinct (although family life, obviously, can be very complex and approached complexly).

An example of a more complex concept is as follows: "In a community in which there are several classes of people living together, there would also probably be several religious groups, several kinds of schools, several kinds of political parties and several kinds of clubs. In a town where there is only one class of person, you do not have these choices." This is considered to be a complex concept because it involves several other concepts, such as "social class." Further, the manifestations of the concept are diffuse and not easy to see unless one gathers and sifts quite a bit of information. It contains many factors whose interrelationships have to be perceived if the concept is to be apprehended.

The concepts were presented verbally to the children and then they were asked the following kind of question: "Is this true in La Stella?" "Is it true in Prestonport?" "Is it true in both Prestonport and La Stella?" In other words, the children were asked to "validate" concepts or, to put it another way, to obtain information about the communities and to make a judgment about whether the concept held for those communities.

The following is the list of concepts most frequently used according to their pre-judged level of complexity.

Concept (Summarized)	Level (1 is the lowest)
All societies have marriage and families. Is this true in Prestonport?	1
Husbands usually earn the living for families. Is this true in Prestonport?	1
In any town or community people have to learn how to get along together. If you were to live in La Stella today, you would have to learn how to get along with the children there. What kinds of things do they do that you don't do? What kinds of things do you think you should learn about so you can play and talk to your new friends?	2
In most families of the world, the men are active outside the home. They take part in many things that have to do with the town and country, while the women stay at home. Is this true in Prestonport?	3

There are many ways of teaching children about their society. If you were growing up in La Stella, you would learn many things about the town. You would learn the words people used for things, and the stories they told. You would learn how the men worked in the fields, and other jobs they had. You would learn what your mother did in your home and in her kitchen. How would you learn these things? Who would teach you in La Stella and where would the teaching be done? 4

The more money, power, and position people have, the more clubs and organizations they belong to. Is this true in Prestonport? 5

In a town where you have several classes of people living together, you will have several religious groups, several kinds of schools, several political parties, and several kinds of clubs. In a town where you have only one class of person, you do not have these choices! How is this true in Prestonport? 5

There is always some way for families to dissolve, (for wives and husbands to separate) but there is always some disapproval. Is this true in La Stella? 6

In agricultural communities (towns where most men are farmers), with clans or households, where more than one family lives, early marriage is encouraged. Is this true in La Stella? 6

If someone is born into a high social class, he will probably stay in school a long time. If he is born into a low social class he probably won't stay in school very long. Is this true in Prestonport? 7

Friendships, visiting, marriage, dating, and belonging to clubs, usually take place within the class into which a person is born. Is this true in Prestonport?	7
Every town and community in the world has people on different levels. It has social classes. Is this true in La Stella?	7

We were particularly interested to learn whether children could handle concepts relating to complex sociological phenomenon such as social status which are generally not studied in the elementary school and which many people feel may be too complex for elementary school children or involve too many levels of inference.

The subjects of the study were ten third and ten fifth grade children from a school in a suburban, middle-class community. The average IQ of the subjects was 110 and the range was 102-134. Ten of the subjects represented the third and ten represented the fifth grade. The children worked as individuals throughout the study. Each individual was oriented to the data storage and retrieval systems and to the two cultures through the self-administering orientation units. Then he was presented with a concept representing level one and asked to find out if it was true for one or another or both of the communities represented in the information systems. He entered the information system in the usual way asking questions and retrieving information until he felt he could make a judgement about the truth or falsity of the concept for that community. At that point, he spoke his answer into a tape recorder and gave the reasons for his answer. He was then presented with another concept and the procedure was repeated. If a student was unable to think of any information he would need to determine whether the concept applied to the culture, he passed on to the next concept. After two successive concepts to which he could not respond, a student was interviewed at that point. Otherwise, after completing the seven concepts, he was interviewed to determine whether he could provide information relative to the culture and the concept. These interviews were analyzed for content according to the following scale:

1. No evidence of understanding the concept. The child was unable to relate information to the concept.

2. Minimal understanding of the concept. Had found information on which he could base an opinion, but did not seem to relate the uniqueness of the culture to the concept. ("Yes, the father always earns the living." "Doesn't the mother ever earn the living?" "No, never.")

3. Showed some discrimination between the concept and the form it takes in the culture. Related material describing the culture to the concept showing how the concept applies to the culture. ("Fathers earn the living mostly, but some mothers work, although only at one or two jobs.")

4. Deals with many aspects of the concept. Uses more than one unit of information to judge the validity of the concept. ("The whole family does some jobs. The whole town, even. So it's fathers mostly, mothers sometimes, and once in a while everybody works.")

5. Seems aware of the difference between the concept and the information which relates to it. Was able to integrate diverse elements, to see how the concept does and does not apply to the culture, and is able to withhold judgment. ("In both places fathers tend to earn most of the living, but people feel differently about it. In Prestonport, some factories use women because they can pay them less. I don't know if the Indians would do that kind of thing.")

The data which is of most interest is derived from the above analysis of the interview data and from the knowledge of whether a child was and was not able to obtain information relative to a concept because he could not think of a question.

In Table Twenty-Two these data are presented for the third and fifth grade students.

TABLE TWENTY-TWO

LEVELS OF CONCEPT VALIDATION BY THIRD AND FIFTH GRADE STUDENTS

	Subject	Concept Level						
		1	2	3	4	5	6	7
	1	4	4	4	2	1		1
	2	3	2	3	4			2
	3	3	3	2		1		3
	4	4	3	3	2		3	
Third Grade	5	1	1					
	6	1	2	2				
	7	3	3	2				
	8	1	3	2	3		2	
	9	2	2	4	2	1	1	1
	10	1	2	2	2			
Third Grade Mean		2.3	2.5	2.4	NA	NA	NA	NA
	11	2	3	4	4	3	4	3
	12	4	3	2	2	2	2	1
Fifth Grade	13	3	1	1	2	2	2	2
	14	3	2	3	4	4	4	4
	15	4	1	5	4	3	3	5

TABLE TWENTY-TWO (con't)

	Subject	Concept Level						
		1	2	3	4	5	6	7
Fifth Grade (con't)	16	2	2	2	2	2	2	3
	17	3	3	4	5	3	3	3
	18	3	3	2	3	3	3	2
	19	5	4	3	2	4	4	4
	20	4	3	3	2	1	1	2
Fifth Grade Mean		3.3	2.5	2.9	3.0	3.1	2.8	2.9

NA = Not Applicable

Where scores do not appear opposite the name of a subject, it indicates that the subject was unable to ask even a single question relative to the concept. It can be seen that the third graders were able to deal with the first three levels of concept, at least most of them were, and the ratings of their interviews almost equal those of the fifth grade students. However, beginning at level four, the third graders began to drop off and only one or two of them were able to cope at all past that point. Apparantly our judgment about the complexity of the concepts had some validity with respect to the third grade students. They appeared to be able to handle the concepts that we judged to be fairly simple but not to deal with the concepts that we judged to be more complex. There were exceptions, and this kind of individual difference can be important. If only 10 percent of the students at a given age level were able to deal with a particular level, we certainly might want to make it available to them.

The fifth grade students appeared to be able to cope to some extent with the concepts representing all levels of complexity. In fact, the mean of their interview scores did not diminish in the course of their inquiry. This, of course, does not necessarily mean that they did not have more difficulty with the more advanced concepts, because they approached each new concept with more information at their command than they had had for the one before, that is, by the time they reached the seventh concept, they had already asked questions relative to the previous six and came to number seven with quite a bit of information about the culture.

For us, however, the important finding is that the fifth grade students were able to deal with concepts of social status and the relationship between social status and other factors, concepts representing ideal types, that is, where a culture is grouped into a major category as an "agriculture" community, questions relative to the characteristics of the power structure in a community, the socialization of children and the structure of the family. The younger children were not able to cope with a complex concept relative to social status and apparently had no strategy at all for approaching those or the other concepts of greater complexity.

These findings need to be interpreted in a cautionary manner. The subjects were intelligent children of middle-class background. Extensive studies of large numbers of children will be necessary before we can even begin to map the kinds of ways children of varying ages and other characteristics are able to deal with social science concepts. Also, the findings need to be interpreted in light of some of our other investigations. For example, we made the judgment following the business task, that few of the students approached the business task with any kind of strategy. Similarly, few seemed to have any kind of "strategy" for approaching the concepts. It seems reasonable to suppose that instruction might have an effect on students' ability to validate concepts by teaching the children how to strategize their examination of cultures. If, for example, we were to teach students sociological and anthropological strategies for analyzing cultures, possibly the younger children would be able to cope with social status and other complex concepts. The fact that a study of this kind indicates that the third grade students had more difficulty than the fifth grade students with a given set of concepts does not mean that we could not affect this through instruction.

However, the finding should nonetheless be cautionary for the curriculum developer. It may be a very different thing to deal with complex social science concepts with the younger children than it is with the older ones. This, of course, is a common sense judgment, anyway, but it raises some very interesting questions about the traditions of social studies instruction. The analysis of communities is frequently conducted in the second, third and fourth grades and it is assumed that students can cope with concepts about community at those levels because they have experience with life in communities. However, it is possible that the complexity of the concepts dealt with is more related to what is optimal in instruction than are factors of experience, taken alone. Perhaps complexity, experience and other factors interact together as important variables in determining what youngsters will be likely to be able to deal with.

The results encourage us to continue two lines of investigation. One of these is to determine whether or not it is possible to teach complex culture models in the setting of the data storage and retrieval systems. The second is to engage in more precise experimentation with more complex research designs into children's concept validation processes and to attempt to identify the dimensions of individual difference which affect validation behavior. In the present study there was no significant coefficient of correlation between social studies achievement, reading ability, intelligence, and the concept validation scores. With such a small and select sample, we cannot conclude from that that there is no relationship between traditional measures of achievement and intelligence and the ability to think about the social sciences. However, it suggests that we investigate whether precise social science thinking is unique enough that it may not be predicted by the usual kinds of academic predictors.

The immediate steps that will follow this investigation are:
A set of investigations would be conducted to determine whether systematic models for analyzing culture can be taught to children of various ages and varying academic ability. Analysis will be made of whether such instruction affects children's ability to validate social science concepts of various complexity levels. The instructional materials prepared by some of the contemporary curriculum projects, such as the Georgia Anthropology Project, will provide independent variables in such an investigation. Also, devices like the "question stimulator" will be developed into instructional materials which can teach ways of analyzing cultures. Since it appears that children using the data storage and retrieval systems are able to explore and apply social science concepts, it may be feasible to develop instructional systems built around that kind of activity. That is, students could be led to validate social science concepts with respect to a number of cultures and then they could be brought together in groups to discuss their findings and

could be shown the kinds of findings that social scientists have made in exploring the same societies. In addition, the students could be led to apply social science concepts to the study of significant social issues and problems and again could share their findings and be introduced to the kinds which have been made by adults. The very rich protocols which resulted from this activity are greatly encouraging. Also, the activity of validating the concepts induced the children to explore aspects of cultures which they had not explored "naturally" in the free inquiry, business, or cultural comparison tasks. Concepts can, perhaps, serve as organizers around which instructional programs can be built which will expand the student's repertoire for cultural analysis.

CHAPTER TEN

THE SIXTH STUDY: SOLVING CULTURAL PROBLEMS

One of the important curriculum objectives in the social studies is to involve elementary school children in the analysis of cultural problems so that they learn how to use the concepts of the social sciences for that purpose and so that they generate more and more innovative solutions to the problems that face cultures around the world. To bring this about we need to build instructional systems that will induce children to engage themselves with social problems.

In the sixth study we attempted to learn whether, in the setting of the data storage and retrieval systems, we could teach children, through a self-administering instructional system, to come to grips with social problems. Second, we attempted to find out whether practice in trying to generate solutions to cultural problems would affect the types of solutions that the children would come up with.

The Design of the Study

The study involved a small sample of fourth and sixth grade students. They were drawn from the Broad River School and represented a range of socio-economic backgrounds. Twenty fourth and twenty sixth grade students participated in the studies. In each grade ten matched pairs were assigned randomly to two treatment groups. The matched pairs were created from data on the intelligence, achievement, and socio-economic background of the students. All of the students were presented with a problem pertaining to the pueblo culture. The problem was: "For many years La Stella has been losing population. See if you can find out what this is due to, and what might be done about it. This is a real problem that bothers many of the people of La Stella. They have seen their town get smaller and smaller, and they hope that something can be done about it. What do you recommend?"

The students were able to withdraw information from the data bank; and when they signified when they were ready, they made a tape in which they attempted to describe their solution to the problem. This tape we shall regard as the pretest for the study. Following the pretest, the students in the control group (that is, ten fourth and ten sixth grade students) engaged in free inquiry into both cultures. The experimental group attempted to solve several problems which were presented to them and which pertained to La Stella or to Prestonport. At the conclusion of this, both groups were presented with another problem, this time pertaining to Prestonport. The tapes that they generated at the conclusion of their attempt to solve that problem represented the post-test.

We were concerned with two issues. One was whether the students were able to come to grips at all with these problems and whether grade or other factors made a difference in their ability to do so. In the second case we were concerned with the effects of the practice in solving problems.

The Criterion Measure

The output tapes relative to the cultural solutions were coded according to four general criteria. These were: pertinence, extensiveness, abstractness, and the relation to the culture.

Pertinence refers to the extent to which the problem solution deals with the problem itself. For example, one might recommend as a solution to Prestonport's population loss problem that industry be brought in. This, however, becomes pertinent only if it will provide more employment and attract people. A highly automated industry that brought in only a few, highly skilled technicians and utilized local labor for the rest of the work force would hardly solve any loss of population problem. To be pertinent, a solution cannot simply nibble around the edges of a problem. It has to come to grips with it.

Relevance refers to the extent to which the problem solution was rooted in the culture. The solution was tailored to the kind of culture, not a kind of all-purpose solution. For example, with respect to Prestonport, one of the reasons for population decline has been the changes in industries in the town. A number of industries, beginning with the whaling industry, the boat-building industry, leather goods, silver crafting and several others have moved away over the years through decisions either by the press of events. (The harbor silted in thus making it impossible to build large boats.) (Owners of the industries decided to move them to areas where cheaper labor was available.) And this commercial-industrial problem is characteristic of the Prestonport problem-loss problem and any solution to its problem, needs to be pertinent to that. In the case of La Stella, economic factors are certainly involved in their population-loss problem, but a major reason appears to be that the young Pueblo Indian begins to learn about the culture outside of him and he no longer wishes to be bound by the confines of the Pueblo. Neither does he wish to live stereotyped as an Indian, and particularly in South-West New Mexico, as an Indian identified with a particular tribe in the area. He moves then to take on a different culture and to escape some of the effects of prejudice, although he is also motivated by jobs which he can get far away from the Pueblo, rather than inside. Any solution to his problem needs to be relevant to his culture. At the same time, the Pueblo has no capital so that the development of an industry is very, very difficult. Consequently, a solution which says "they should build a lot of factories" would not necessarily be relevant to La Stella, whereas Prestonport has people who have capital, or can raise it, and existing industries which can be expanded.

Extensiveness refers to whether or not the solution to the problem is comprehensive and includes the variety of factors that are involved. A more extensive solution to the population-loss problem recognizes that more than one factor caused the problem, and generates a solution that affects more than one factor. When we refer to extensiveness, we mean the extent to which the solution to the problem takes into account the comprehensive factors in the culture that relate to the problem.

Abstractness refers to the complexity of the solution to the problem in terms of the extent to which it provides a general rather than a specific solution. An abstract solution represents an attempt to integrate a variety of complex factors as they operate with respect to each other. If one says, "Prestonport should make a resort by the sea to attract business," that does not deal with the fact that there is already a resort there, and one which actually contributes to economic decay, then we would say that the solution is concrete rather than abstract. If one says however that a resort should be built, that dredging of the harbor should go on at the same time, and that a marina should be built to attract boating to the area, then one begins to deal with the complexity of factors, his solution is more abstract. Abstractness indicates the ability to integrate diverse factors, but to differentiate among them. It differs from extensiveness in the integrativeness and differentiatedness of the response. An extensive response might list a lot of factors, but an abstract one tends to put them together and make sense out of them.

The pre- and post-test problems were analyzed according to the above four criteria and it is they which constitute the most meaningful data in this investigation. We are concerned to ask the questions, "Were there any differences between the control and experimental groups with respect to changes in the scores reflecting the above criteria?" "Were grade and intelligence related to performance on the problem-solving tasks?" And, finally, we are concerned with the general question, "Can the children working in the data bank setting discuss problems of significance to the cultures under consideration?" With respect to the first questions, we turn to statistical evidence. With respect to the fourth, we look at the descriptive data which is available concerning the children's ability to ask questions relevant to the problems and the extent to which their protocols reflected a real coping with the problems under consideration.

The Comparison of the Control and Experimental Groups

Tables Twenty-Three, Twenty-Four, Twenty-Five, and Twenty-Six present the comparison of the control and experimental groups on the four criteria--pertinence, abstractness, extensiveness, and relatedness to culture. A two-way analysis of variance enables us to look at treatment and grade and interaction between them.

TABLE TWENTY-THREE

PRE - POST TREATMENT DIFFERENCES IN PROBLEM SOLUTIONS FOR FOURTH AND SIXTH GRADES: PERTINENCE

	Control Group	Experimental Group
Grade Four		
Mean	-.3	+.2
Grade Six		
Mean	-.7	+1.3

ANALYSIS OF VARIANCE SUMMARY

Source	SS	df	MS	F	Level
Rows	1.6	1	1.6	1.14	NS
Columns	10.0	1	10.0	7.14	.025
Interaction	2.5	1	2.5	1.78	NS
Error	50.0	36	1.4		
Total	64.1	39			

TABLE TWENTY-FOUR

PRE - POST TREATMENT DIFFERENCES IN PROBLEM SOLUTIONS FOR FOURTH AND SIXTH GRADES: EXTENSIVENESS

	Control Group	Experimental Group
Grade Four		
Mean	-.1	+.3

TABLE TWENTY-FOUR

PRE - POST TREATMENT DIFFERENCES IN PROBLEM SOLUTIONS FOR FOURTH AND SIXTH GRADES: EXTENSIVENESS

	Control Group	Experimental Group
Grade Six Mean	-1.0	+.7

ANALYSIS OF VARIANCE SUMMARY

Source	SS	df	MS	F	Level
Rows	.625	1	.625	.43	NS
Columns	11.075	1	11.075	7.62	.01
Interaction	4.200	1	4.2	2.91	NS
Error	52.000	36	1.44		
Total	67.900	39			

TABLE TWENTY-FIVE

PRE - POST TREATMENT DIFFERENCES IN PROBLEM SOLUTIONS FOR FOURTH AND SIXTH GRADES: ABSTRACTNESS

	Control Group	Experimental Group
Grade Four Mean	+.2	+.2
Grade Six Mean	-.6	-.2

ANALYSIS OF VARIANCE SUMMARY

Source	SS	df	MS	F	Level
Rows	2.5	1	2.5	2.77	NS
Columns	.1	1	.1	.1	NS

ANALYSIS OF VARIANCE SUMMARY (cont'd.)

Source	SS	df	MS	F	Level
Interaction	1.8	1	1.8	2.00	NS
Error	32.7	36	0.9		
Total	37.1	39			

TABLE TWENTY-SIX

PRE - POST TREATMENT DIFFERENCES IN PROBLEM SOLUTIONS FOR FOURTH AND SIXTH GRADES: RELEVANCE

	Control Group	Experimental Group
Grade Four Mean	-0.4	+0.3
Grade Six Mean	-0.7	0.0

ANALYSIS OF VARIANCE SUMMARY

Source	SS	df	MS	F	Level
Rows	0.9	1	0.9	0.69	NS
Columns	4.9	1	4.9	3.77	.10
Interaction	0.0	1	0.0	0.0	NS
Error	46.6	36	1.3		
Total	52.4	39			

Pertinence and Extensiveness show differences in favor of the experimental groups at a high level of significance and relatedness at the .10 level. In no case were grade differences or interaction significant. The problem-solving practice apparently affected the solutions students generated, but grade differences were not significant nor did grade and treatment interact.

It is important to note that the experimental treatment consisted simply of practice in solving cultural problems unaccompanied by instruction. Furthermore, the control treatment involved as much exposure to the culture on which the post-test problem was based as the experimental group had during their practice problem. The characteristic of the training program was practice and an orientation toward problems which was embedded in the task.

I.Q., parent's occupation, and reading were not associated with performance on the pre-test or on the post-test, and did not appear to be related to the effectiveness of the training program. (All correlations were near zero.)

Important, although difficult to describe adequately to anyone who did not participate in the experiment, was the fact that the students apparently enjoyed trying to solve the cultural problems, and they stayed with the problems right to the end of the experiment. With respect to the sixth grade, this was particularly true. The sixth grade experimental group on the average explored over 25 general categories in the area file system during their exploration of the cultures. This represents about one-third of the possible general categories which they could have explored. Consequently, it appears that simply from the point of view of inducing students to broad cultural analysis, the experimental program involving the problem-solving practice functioned to get the students exploring a great many aspects of the culture. The evident enjoyment the children took in the tasks, plus the range of their questioning, hold promise for building instructional systems around cultural problems of the sort we used in these experiments.

Descriptive Data Concerning the Problem Solutions

In order to get some insight into the texture of the student solutions of the problems, pairs of students were asked to discuss the problems and a tape-recording was made of the discussions. Here follow two of the protocols which resulted from these conversations. They are presented here to help the reader get a feeling for the relative degrees of complexity with which the students appeared to take hold of the problem.

William Schofield and Joseph Letizia

William — I think people would be moving out of LaStella because the pay is not good and it is surprising they can live there on what pay they do get. Their houses are not very good and they are made of mud. I think they could raise the pay for the workers and a lot more people would stay.

Joseph — I think the population is slowly going is because their schools weren't so good. They went only from kindergarten to sixth grade, then they go to government boarding school in Santa Fe. Their work is as good as anybody else's in America up until the fourth grade. Also the men were not paid in money that often.

William — I think another reason why people would be moving out is because the work is too hard to do and there is so much of it to do. Their houses were not very good and I wouldn't like a mud house because if a heavy rain came it would wash it right away.

Joseph — The reason why a lot of people would be moving out of Prestonport is because a lot of the people were clamdiggers. I think they wouldn't like that very much. They were overpopulated. After Prestonport was settled people came from all over the world to work in the factories and shipyards. They had ghettos where all the rich people lived in one place and the poor people lived in another. Most of the children only went to grade school.

William — Schools in Prestonport are very small and the rooms are too crowded. I wouldn't like to have a crowded room because I would get squished every time I went to sharpen my pencil. The pencil sharpener would be over popular because everyone would have cracked pencils. I wouldn't like to have religion in my classroom, I'd like to have it some other time like I do now. I have it on Sunday morning instead of in the classrooms on regular afternoon days. I also think people would be moving out of Prestonport because the people of Prestonport made 40-1/2¢ an hour. There are all kinds of people in Prestonport and it is very hard to find work.

In 1950 people working or looking for work, there was 10,941 and the people who couldn't find work was 425. In 1958, 14,730 people were working or looking for work and 1,610 could not find work. In 1961, 13,420 were working or looking for work and 1,640 could not find work. Their pay was not very good and I would not like to live there. The religion of the people - the people in Prestonport had churches and they believed in the Bible. Their religion was strong.

Joseph A lot of the people coming back from the service would be shoemakers. Some would be farmers if their fathers were. It would be hard to find a job because the managers were very strict and choosy.

William People coming out of the service they could be in telegraph as they could of learned in the service. And as for making houses he could have the money because he gets paid in the service. And for more education they could go to night school and learn a lot more.

Joseph If the shipyards closed a lot of the men would be out of a job, some of their recreation would be gone too. They would probably protest.

William I couldn't add anything to what Joey says so I'll just say I agree 100%.

Joseph They use very little water for pleasure. Most of the boats were used for fishermen. The pleasure boats could scare the fish away from the fishermen so that they would be out of a job.

William Prestonport had all different kinds of boats, I will tell you a few now - they had cabin cruiser boats, and they had flat bottom boats. They build row boats and double decker boats which were very big. They had gas engine boats otherwise known as motorboats and they had very very small boats for the children, so the children could go swimming and play in boats. We know that Prestonport would have supplies because they were building boats for years. They had trained people because they were building boats for years.

Joseph There would be a huge demand for pleasure boats because more and more people are buying boats every year.

Robert Grippo and Stacey Stroffolino

Robert My name is Robert Grippo. I think the people are leaving La Stella because the roads aren't tarred and the sand could blow in their eyes and they could get killed or crash up. I think they should tar the roads so they wouldn't crash up or anything and so their houses would be more prettier and the cars would last longer.

Stacey My name is Stacey Stroffolino. La Stella is losing population because of the foods they have. Because they don't have any milk, they only have corn and maize corn.

Robert I think the people are leaving from Prestonport because their jobs aren't good and they aren't earning enough money. And I think the boys and girls aren't learning enough about arithmetic and reading and all. I think we should get over there and build better schools and get better teachers over there to teach them more than they know now. They should get new businesses and night schools so the people could learn to trade.

Stacey Prestonport is losing population because they had to paint their own houses and they had curved church windows and steel fences so they couldn't open up their doors. I think they should get painters in there to paint the houses and things to make them look a little bit better than what they were.

Robert To build boats in Prestonport, more supplies. We should chop down trees so they could have wood for supplies and bricks to build docks. The people there are trained for boat building and they would want them for pleasure boats.

Stacey	In Prestonport they have enough supplies to make boats and the people are trained. People would want to have the boats. They make their boats out of wood.
Robert	If two of the largest factories in Prestonport closed down they would start to move out and the town would start to fall down in pieces because nobody would be taking care of it. They would get poor and they should move away to better jobs and to where they could get jobs.
Stacey	If two of the largest factories in Prestonport were to close down a lot of the people would be moving out and they wouldn't have enough money to be getting other jobs. They would try to get a lot of men to go back to Prestonport and build better jobs, better businesses and better houses.
Robert	The things I learned about La Stella are that they have corns and everything and they eat food and they have schools and their houses are made out of wood, and the schools are made out of bricks. The roads are dirty and the dust flies all over the place and I think we should tar them. La Stella is a small town. Their ovens are like the shape of an igloo and they have a door that opens and they have a stick and they put their food on and they put it in and they take the stick out and it stands on something and it cooks. They have good baseball fields and they are better than the roads.
Stacey	The things I learned about La Stella are that their ovens are shaped like igloos. The foods they eat are chili, tobacco and the fruits they eat are grapes, watermelons, muskmelons, cherries, apples, apricots, watermelons. They wash their clothes in grain. The clothes they wear are dungarees, levis, dresses, and skirts.
Robert	The things I learned about Prestonport are, Prestonport has trains going to Boston and Boston doesn't have one train so far that I knew of that goes to Prestonport. Prestonport highway goes through several states and the roads are tarred.

They didn't have good jobs and they didn't get enough money. They had pleasure boats and they made nice boats and they had big boats. They had good planes and they fly all over the place. Prestonport is located near Massachusetts. Prestonport is near the Atlantic Ocean.

Stacey — The things I learned about Prestonport are the foods that they eat are strawberries, huckleberries, grapes, blueberries, and other foods. They had one great boat and it had seven masts and that was the nicest boat that they had. Their houses were made out of wood and bricks. They had nice homes. The factories they had wool, and cotton. That is all I can remember.

From watching the students inquire into the problem, analyzing their solutions, and listening to the conversations like the ones transcribed above, we arrived at the strong impression that the students were able to take hold of the kinds of cultural problems that were presented to them. We believe that it is feasible to build major sections of social studies curriculums around such problems at the elementary school level, particularly if one provides informational support that enables the students to explore the aspects of the culture that are related to the problems.

However, as in the case of the other tasks which were used in our series of studies, the students evidenced very little strategy for approaching the problems. They will essay the problems. The resultant inquiry leads them to explore many aspects of the cultures, but they need exposure to concepts and modes of analysis drawn from the social sciences or from other sophisticated sources.

SUMMARY

It appears that the fourth and sixth grade students were able to cope with the social problems--at least to some extent. Practice in problem-solving appeared to benefit the kinds of solutions generated by the experimental group. Grade was no factor in the effectiveness of the treatment, and age, parents' occupation, and reading ability did not affect performance. The number of categories which were searched by the problem-solving groups encourages us to believe that instructional systems can be developed both to affect problem-solving ability in the social science domain and to lead students to explore many aspects of culture.

The problem solutions indicated that the students had probed many aspects of the culture, but little strategy for approaching and solving problems was detectable in the protocols.

CHAPTER ELEVEN

THE SEVENTH STUDY:
THE EFFECTS OF REORGANIZING THE CATEGORY SYSTEM

This investigation was designed to explore what would happen if the data in the information systems was reorganized into many fewer categories, particularly if these categories were made relevant to the children's questioning patterns.

The study was considered important for two reasons, aside from the general curiosity which we had to find out the extent to which the category systems themselves play a part in the children's inquiry. In the first case, if much shorter category systems can be used effectively, it will be much more feasible to teach them directly to the students. In all of the investigations reported in this monograph, the children did not know what the category system was. They simply knew that their questions were translated into numbers that were the key to their obtaining data relevant to their questions. However, to develop instructional systems using information support systems, it would be desirable to develop category systems which the children could use themselves. While we believe it is feasible to teach many elementary school students the index to the area file system or another index system of similar complexity, it seems clear that such a complex operation would be beyond the capacity of a good many children. A smaller system could be taught more easily. The second interest was to see whether we could base an index system on the most frequently asked questions by the children and, by storing more data in those frequently-explored categories, to induce the children to probe more widely into the cultures concerned. In other words, when we use the human relations area file or any other adult-constructed system, the children are dependent for their points of entry on someone else's set of categories. If, however, we learn what kinds of categories the children themselves use and then base the system on those categories, we may get a very different result.

The Design of the Study

The intent of the study was to determine the effect on the input and output variables of varying the category system that provided entry to the information.

An analysis was made of the frequency of use of area-file categories by students during the free inquiry and the business task. The 35 most used categories were selected for the basis of an abbreviated index system, based on the actual questioning behavior of the children. The entries of the data storage and retrieval system were reorganized under the 35 new categories, resulting in the data storage and retrieval system within whose categories more information was stored (and, concomitantly, information which was only peripherally relevant to the face meaning of the category title). The experiment consisted of matching two groups of children from the fourth grade of the middle-class Wilton School and presenting one group with the free inquiry task using the old category system while their matched pairs were presented with the free inquiry task but used the new category system of 35 categories derived from children's questions. The focus of the study is on the kinds of themes generated by the students and attempting to describe the cultures and on the amount and kind of help needed by the students during their inquiry.

The sample consisted of only ten children in the experimental group, matched with ten children in the control group. However, the children represented a very large variation in intelligence and in addition their average was far above the usual. Specifically, the IQ scores of the students ranged from about 95 to over 150 in both the experimental and the control groups. This kind of sample was utilized for two reasons: In the first case, we suspected that variations in intelligence might be a source of variation in behavior with respect to changes in the category system, so the great range of intelligence was desirable. Second, the highly variable behavior of the more intelligent children would, we felt, increase the likelihood of detecting differences.

The Number of Themes Generated

In Table Twenty-Seven, data are presented comparing themes generated for the five children having the lowest and highest IQ scores for both the experimental and control groups.

TABLE TWENTY-SEVEN

THEMES GENERATED BY STUDENTS OF DIFFERING IQ USING THE OLD AND NEW CATEGORY SYSTEM

		Category System			
		Old		New	
I.Q.	Low	6		11	
		2		6	
		6	Mean=6.2	7	Mean=9.2
		8		5	(Total Mean=7.7)
		9		17	
	High	13		9	
		9		10	
		9	Mean=11.2	14	Mean=12.2
		10		11	(Total Mean=11.7)
		15		17	
		Total Mean 8.7		10.7	

Analysis of Variance Summary

Source	Sums of Squares	df	MS	F	Level
Rows	80	1	80	4.76	.05
Columns	20	1	20	1.19	NS
Interaction	61	1	61	3.63	.10
Error	268	16	16.8		
Totals	429	19	22.6		

It can be seen that the mean number of themes generated by the higher IQ groups was greater than that for the lower IQ groups. This was true for the experimental and the control groups. The mean number of themes generated by low IQ students was greater when the new system was used with the mean under the old category system being 6.2 and the mean for the new category system being 9.2. However, the difference was not so great with the high IQ group with the experimental treatment group having a mean of 12.2 while the control group mean was 11.2. Apparently the new category system benefited the children of lower IQ more than it did the children of higher IQ. The analysis of variance bears this out. The difference by IQ (Rows) was significant. The difference attributable to treatment (Columns) was not significant. Interaction, however, reached the .10 level, reflecting the interaction between IQ and treatment, the treatment making the greatest difference for the children of lower IQ.

The veritable flood of information which was received under the experimental conditions apparently increased the themes generated by the low intelligence group. We had been concerned lest the large quantity of information might be confusing and actually dampen the output.

SUMMARY

In this investigation we varied the size and base of the category system and compared the themes generated by matched groups of subjects in the free inquiry task conditions, one group using the original and the other using the shortened category system.

Output did not vary much for the higher IQ children, but increased under the new category system for the lower IQ children. However, the richness of the themes generated by students inquiring under the new system suggests that there may be non-quantifiable effects worth tracking down.

The content of themes generated did not vary much with respect to the change in categories. Aid given differed not at all in terms of the mechanical problems of retrieval, but some of the students using the new system required much help with reading because of the mass of material they were receiving.

The following working hypotheses emerge:

1. The broad-based, logical, orthogonal categories of the anthropology file may be adequate for the most academically able students, but less able students may benefit from the development of category systems which increase the flow of information and which is tuned to their questioning patterns.

2. A change in entry system may require a corresponding change in support systems (as provisions for reading help).

3. The large flow of information did not dismay the students. However, this aspect requires investigation with a sample representing much less able students as well.

4. The richness of the output protocols suggests that the immersion in information which resulted from the use of the shorter, question-based category system had effects which did not appear in the quantified data.

The input and output of the treatment group which used the old category system bears a close look, for it sheds light on these findings. Table Twenty-Eight presents the number of categories searched by each subject when subjects are ranked by IQ.

TABLE TWENTY-EIGHT

GENERAL CATEGORIES SEARCHED BY IQ
UNDER THE "OLD" CATEGORY SYSTEM

IQ Rank	Number of General Categories Searched
1	26
2	21
3	12
4	21
5	13
6	16
7	17
8	11
9	3
10	7

It can be seen that IQ and categories-searched were related. Three of the students actually searched over one-third of the sixty-one general categories! In other words, by asking many questions, and particularly by asking broad questions, the academically more able students, using the old system, retrieved a good proportion of the available data. The effect of the new category system was probably less, then, for academically able students because they were able to use the old system so effectively. The less able students, on the other hand, withdrew less data from the old system, and the impact of the new index was greater for them, for with a few questions they received much data from the new system.

In other words, the more able students made a more complete use of the old category system, which is reflected not only in the number of categories which they explored but in the number of themes which were generated. The new category system pulled the less able students into more areas of inquiry and this is reflected in the number of themes which they generated.

The results suggest that it would be worthwhile to investigate a number of types of entry systems and particularly to search for optimal combinations for less able students. For the more able students the relatively orthogonal categories of the large system may be quite satisfactory, for they provide great freedom of inquiry. It is possible that the very able children have sufficient flexibility in problem-solving ability that the larger system suits their needs. The less able students may need systems which will match their learning styles more directly.

TABLE TWENTY-NINE

CONTENT OF THEMES GENERATED BY STUDENTS USING OLD AND NEW CATEGORY SYSTEMS IN TERMS OF GENERAL CATEGORIES OF THE AREA FILE INDEX

Category Number	Old System Frequency	New System Frequency
1	5	7
2	5	10
3		
4		2
5	3	2
6	3	
7	2	2
8		
9		
10		
11	2	
12	9	16
13		3
14	6	4
15	1	2
16		
17	10	9
18	1	2
19	9	6
20		

TABLE TWENTY-NINE (cont'd.)

Category Number	Old System Frequency	New System Frequency
21	2	1
22	1	
23		
24		
25	2	1
26	5	2
27		
28		
29		
30	1	
31		3
32		
33	4	4
34		
35	2	
36		1
37	4	3
38	5	4
39		
40		4
41		
42		
43		
44		3
45		
46		
47		
48		
49		
50	1	2
51	2	2
52		4
53	3	2
54		
55		4
56		
57	4	1
58		1
59		1
60		
61		2

The Content of Themes Generated

In Table Twenty-Nine the themes generated are categorized according to the 61 major categories of the area file index. It can be seen from the tally that the content of the themes generated was pretty much the same for students using the two systems, although an attention to machines, property, the arts, and death was greater with respect to the newer category systems. Four out of ten of the students using the new category system mentioned the arts, four mentioned death, and four mentioned machines, whereas no student using the old category system dealt with any of those three topics. With respect to whether the new category system actually "pulled" the students into new areas of inquiry, the results are inconclusive, although the inclusion of the themes which were rarely touched on by other students in any of the free inquiry studies encourages us to believe that categories might be manipulated for this purpose. However, it might be just as well to use tasks for that function rather than to distort the logic of a category system. (The Problem-Solving and Concept Validation studies both give clues about the use of learning tasks for this purpose.) Some of the non-quantifiable data from the study, however, suggests a kind of benefit from the use of the new category system which is not reflected in the data presented. There follows the tapes of the two children as they describe the "Pueblo". These transcriptions are not long--they are not nearly as long as many of the output tapes which we received in the course of the long series of studies. However, they appear to us to be exceptionally cogent. Both tapes were produced by students using the new category system. One student's IQ score is around 120. The other is nearly 150. In both cases the comprehensive descriptions of the cultures with many interrelated ideas being explored impressed us greatly. Although the general effect of the use of the new category system appeared to be greater with respect to the less able children, for these two a richness of inquiry appeared to develop that is not reflected in the quantified data.

Output Tape for Subject #7 Using the New Category System

The pueblo Indians have many kinds of work to do. The men bring the clay from the fields and the woman shapes them into pottery. Then they let them bake in the sun. The woman makes all sorts of kinds of pottery. The population of La Stella is approximately 500 persons. It is located in New Mexico. It is beside the Rio Grande River. The Pueblo Indians are using electric more and more because they find that electric costs less than gasoline or kerosene lamps. Almost every family has a radio or/and an iron. About one-third of the population has TV. Some have refrigerators. The church has an electric organ. When they need help, they usually ask their relatives. Very seldom do they ask their friends. When the Indians are on a hunt, they usually stay for about a week. The people in La Stella are mostly farmers.

When it is time for ditch cleaning, all the people in the town have to work or they pay a dollar or they find somebody else to do it for them. Very seldom do they find anyone else that will do it for them.

The north side of La Stella are mostly new homes or houses. The other sides are mostly field or crops and ditches. The people in La Stella are mostly Pueblo Indians. Most children go to government schools outside of their town. When a child is born, he or she is named by her or his godfather. Their friends name them, too, but their friends, but the names that their friends give them are his or her nickname. There are two stores in La Stella where the Indians buy most of their things. Some Indians go out to other bigger cities to buy other things that the two stores in La Stella doesn't have. The old La Stella houses are made out of adobe. They are usually two or three stories high. The way you get into the house is by means of a ladder. The new houses are usually one story high.

Output Tape for Subject #14 Using the New Category System

I'm going to tell you about La Stella. They've been living there for only a few years. Before that they believe that some people from the Old World....

La Stella is a small Indian village in the west of the United States. Their main food crops that they they grow. They grow corn, wheat and a few fruits. With the wheat, they make bread and cakes that they eat on special occasions and regular days. They have a main store in the village where they get most of the things that they need which they can't make. The people in La Stella believe that a long time ago, at the beginning of the world, there was one main tribe and they knew that there was going, and one man knew that, and a few people knew that there was going to be a big rain and so he built a big boat and built it with two of each handles and when the big rains came they floated around for a long time and then they stopped and they said and they sent out a bird, and the bird said there was land, so they stopped there. Then, many years later, when there were many tribes all over the world, one of them in the west of the United States was called the Navajo which came to live at La Stella. La Stella just started as a small camp then. The small village. All they had were a few crops and sometimes they went hunting for a few animals. But some of the animals they considered were sacred and they did not hunt; they fed them. The bear was one of them, and the rabbit. The people in La Stella consider war as a bad thing and for work sometimes they work on their farm but some of the young men go out and go into the Service or go to a white man's school and learn to work in a big factory outside the pueblo. But a few of the older men stay and work on the farms. One reason why the young men leave is that they fear that there may be no rain and their crops would be ruined. So they go out and go to a school and have, and get a job in a factory. One way they got salt was to go to the salt lake with salt water. They could not laugh or make fun there or else the salt woman would be anger and would go against them. If this happened they would bring her many presents and good offerings for her to make her happy. They had many spices, too, which they used in making things, to add flavor to them. To irrigate the corn, they have to have irrigation ditches, and sometimes these ditches in the year get clogged up, so they have to clean them up. So one of the men appoints the other man, the man to be in charge of cleaning out the ditches, and then all the men out of the pueblo will come and clean out the ditches for their corn. If one man cannot clean out the ditches, if he was sick or something like that, he would have to get another man to help him by paying him for that. They pay him, like feeding him or something.

There is another group of people who do work for others. This is mainly just regular people, but these people are special. If someone wants them to do something for them, they will go and do the work. Then, for their pay, they will ask for something to eat. If you are in this group and need help, and one of the other people need help, you do not pay them and they do not pay you. It is pretty easy to live in La Stella except for when it doesn't rain; then they have to catch animals to eat.

Comment

We have been concerned throughout the whole series of studies with what the children have not seemed to learn about the cultures as we have been with what they did seem to learn. These two tapes encourage us to believe that if we can learn to combine tasks with appropriate information sources, we can support the inquiry of children into areas which they normally do not explore and which evidently the usual types of social studies instruction does not lead them into.

Help Given

Table Thirty compares the types of aid given to students by the assistants under the old and new category systems. It can be seen that mechanical help was about even and the miscellaneous category was fairly low for both groups. More aid was given with respect to reading, however, under the new treatment, with the total being 56 or an average of 5.6 per student, compared to 22 or an average of 2.2 per student. This reflects the greater number of entries which the students receive per question asked of the abbreviated category system. One student, whose IQ score is 101, accounted for 23 of the times that aid was given with respect to reading and one other student whose IQ score is 134 accounted for 15 of the other incidents. Except for those two students the groups were almost equal with respect to aid given in this respect.

TABLE THIRTY

AID GIVEN TO STUDENTS USING THE "OLD" AND "NEW" CATEGORY SYSTEMS

	Type of Aid Given			
	Mechanical Devices	Reading	Other	Total
Old System (10 students)	13	22	17	52
New System (10 students)	6	56	6	

The results of this analysis appear to indicate that when the greater flow of entries occurs as with the use of the new category system, one must be prepared to provide the kinds of support which the students will need in order to cope with the reading material and possibly with other problems. It points up the need especially under a broader category system to have a satisfactory, self-administering aid-given device with respect to reading. (See Chapter Twelve for a general analysis of the problem of providing assistance to students.)

CHAPTER TWELVE

THE EIGHTH STUDY: HELP NEEDED BY THE CHILDREN

Throughout the entire series of investigations, one of the major concerns was to identify guidelines for the development of more effective information support systems for children. In the course of the investigations there was embedded various aspects of a continuing study of the types of difficulties that the children had in using the two data storage and retrieval systems and of the kinds of help that we found it necessary to provide in order to smooth their retrieval of information.

In this chapter we will report data which was collected in the following manner: throughout the series of investigations, the research staff attempted to provide to the students a minimum of help in order not to interfere with their activity. Help was given however when one of two circumstances was present. The first was when a child directly requested help, as when he said, "I can't read this word, will you tell me what it is?" Or, "I can't find this slide." Second, help was given when it was observed that a student had come virtually to a complete stop in his activity and remained so, in which case one of the research staff would approach him and ask, "Can we help you in any way?"

After giving assistance, the research staff filled out the "aid-given" form specifying the type and amount of help given. (The "aid-given" form appears in the Appendix.) In addition, each time a student requested a tape to help him in reading, the request was tabulated as well.

In the following pages the data thus obtained are analyzed as they were collected during the Free Inquiry Task, the Business Task, and the "New Category" Study. The first two were selected because they involved a relatively large number of children and the third because it provides some understanding of the effect that the new category system had on aid-given and also because it permits us to look at a wholly middle-class sample in comparison with the broad range of backgrounds of the children in the Free Inquiry and the Business Tasks. Table Thirty-One presents the means and standard deviations for grades two, four, and six with respect to the number of tapes requested and the number of requests for assistance which was rendered during the Free Inquiry Task.

TABLE THIRTY-ONE

FREQUENCY OF TAPES REQUESTED AND AID GIVEN DURING THE FREE INQUIRY TASK BY GRADE

	Grade 2	Grade 4	Grade 6
Tapes Requested			
Mean	1.201	1.625	1.350
SD	1.649	2.225	1.545
N	30	32	40
Aid Given			
Mean	7.833	7.594	5.097
SD	3.291	7.317	3.984
N	30	32	40

The number of tapes requested was about the same for each grade but it needs to be remembered that the second graders asked many fewer questions than did the children from the upper grades. However, it became clear throughout the studies that children who had not previously used the system would ask for tapes on their first one or two or three questions and then would cease asking for the tapes. After a child had asked three or four questions he very rarely asked for a tape. This led us to believe they were asking for the tapes more for the novelty of it than anything else and that they were not asking for the tapes to help them with their reading. We will return to this question again shortly.

With respect to the frequency of aid-given the second and fourth grades were about equal and the sixth grade much lower. However, again it needs to be remembered that the second graders asked many fewer questions so their requests per question asked was larger than that of the older children. Also, the sixth grade tended to receive help during their first one or two retrievals and then would proceed pretty much on their own, requesting assistance only occasionally. In general, we came to believe that a thorough orientation to the use of the systems, supplemented by the availability of aid during the first few retrievals would bring most of the older students to the point of near independence with respect to the use of the systems.

Let us turn now to the relationship between the numbers of questions asked by the students and the number of tapes requested, the number of requests for assistance, intelligence, and reading achievement. These data are presented in Table Thirty-Two. There was a positive and significant correlation between the number of questions asked and number of tapes requested confirming the suggestion we have made earlier that the more questions the students asked the more they were likely to request the tape. However, the number of tapes requested was not correlated with IQ or reading achievement, lending some support to the idea suggested earlier that the tapes did not function to support reading difficulty. If they had done so we would have expected a positive correlation between tapes requested and reading achievement. We may question whether this form of reading assistances was what the students were looking for.

Aid-given, on the other hand, was not related to questions asked. In fact the correlation was almost exactly zero. Nor, interestingly enough, was aid-given related to tapes requested.

What is really quite interesting and quite puzzling is that aid-given was positively related both to IQ and negatively related to reading achievement. In other words the poorer readers asked for significantly more amounts of help than did the good readers but they did not ask for more tapes. Possibly, when they needed help with reading they turned to the attendant rather than to the tape. We will look at this question shortly as we analyze the kinds of requests for aid that came from the youngsters. On the other hand, what is quite puzzling is that intelligence was positively related to requests for assistance indicating that more intelligent children asked for more help. This interesting finding is disturbing to some extent because the less intelligent children may have needed help but may not have been asking for it as much as they might. Or, possibly, intelligent children are more comfortable in school environments and feel more free to ask personnel for assistance. The matter warrants study.

TABLE THIRTY-TWO

CORRELATION COEFFICIENTS BETWEEN INPUT VARIABLES, AID GIVEN, CHILDREN'S INTELLIGENCE, AND READING ACHIEVEMENT FOR THE FREE INQUIRY TASK (GRADE FOUR)

Variable Description		Correlation Coefficients				
		1	2	3	4	5
Questions Asked	Var. 1	______	.471xx	.052	.096	.131
Tapes Requested	Var. 2		______	.120	-.068	.079
Aid Given	Var. 3			______	.410x	-.620xx
I.Q.	Var. 4				______	.281
Reading Achievement	Var. 5					______

Let us look at the data for grade six for both the Free Inquiry and Business Tasks and see if we have the same type of pattern that appeared in the fourth grade data.

TABLE THIRTY-THREE

CORRELATION COEFFICIENTS BETWEEN INPUT VARIABLES, AID GIVEN, INTELLIGENCE, AND READING ACHIEVEMENT FOR THE FREE INQUIRY TASK (GRADE SIX)

Variable Description		Correlation Coefficients 1	2	3	4	5
Questions Asked	Var. 1	_____	.044	.157	.006	-.039
Tapes Requested	Var. 2		_____	.184	-.026	-.048
Aid Given	Var. 3			_____	-.047	-.001
I.Q.	Var. 4				_____	.651xx
Reading Achievement	Var. 5					_____

xx significant at .001 level.

In Table Thirty-Three the patterns of correlations are very different. The number of questions asked was unrelated to any of the other variables indicating that neither tapes requested nor aid given functioned with respect to questions. Tapes requested was unrelated either to other kinds of aid given or to intelligence or reading achievement, and aid given was unrelated to intelligence or reading achievement. The only significant correlation is the usual one of the relation between IQ and reading achievement, but this did not occur in the grade four sample strangely enough.

The grade differences in the correlation patterns that appeared in Table B and Table C repeated themselves although not completely in the other studies. Particularly, in several of the studies reading achievement for the fourth grade was again negatively related to number of requests for assistance but there was no such correlation in the sixth grade. We speculate that by the sixth grade almost all of the children were pretty well able to read the material without help and therefore the frequency with which they were seeking aid given for that purpose had dropped off. On the other hand, a positive correlation between IQ and aid given occurred several times in the studies and suggests that we need a closer look at IQ and abilities to function within the system.

The Content of Aid Given

The results of the aid forms were tabulated in order to provide a picture of the kind of help students requested in the various studies. In Table Thirty-Four the frequency of aid given for various purposes is tabulated for the Free Inquiry and the Business Tasks for all grades.

In Table Thirty-Four it can be seen that mechanical difficulty or help with the retrieval process should not vary tremendously from grade to grade, that need for help with the instructions was apparently not great at any level and that the sixth graders requested much less help with reading than did the fourth graders, third graders, or second graders. This difference could relate to the difference in correlation between reading achievement and aid given between grades four and six. It will be recalled that there was no significant correlation, a negative one, between reading achievement and aid-given for grade four but not for grade six. In other words the poorer readers needed more help in grade four but not in grade six. We hypothesized earlier that this was due to the fact that at grade four the children still needed help with reading and therefore requested it on that account thus affecting the frequency of the help they were receiving. On the other hand, nearly all the sixth graders could handle the reading level of the material without assistance and therefore reading achievement at that grade level was not affecting the frequency of aid given.

It may also be of course that the normal behaviors of the children in school are reflected here. Perhaps sixth graders actually needed help with reading as much as the fourth graders but fourth grade children are still accustomed to asking for help and feel no loss of face in doing so while sixth graders are not accustomed to asking for help in reading as much and may feel a loss of face if they do ask for help.

One of the interesting findings, at least to those of us who were involved in the investigation, is the very considerable difference between the mechanical help given between the Free Inquiry and the Business Task. When grade six was involved in the Free Inquiry Task, a research assistant gave help 65 times for mechanical difficulty whereas during the Business Task help was given for mechanical difficulty only 22 times. For grade four the figures are 65 and 27 respectively and whereas second graders were given help 95 times for mechanical difficulty during the Free Inquiry Task, third graders were given help for that cause only 20 times. Since the Business Task study was done after the completion of the Free Inquiry study, and because of our informal observation, we are inclined to attribute the difference here to the training of the research assistants. What we believe happened is that the inexperienced assistants during the first study were not as efficient

TABLE THIRTY-FOUR

TYPES OF AID GIVEN IN FREE INQUIRY AND BUSINESS TASKS BY GRADE

	Types of Aid (Percentages are in Parentheses)					
	Mechanical (Tape Recorder and Projector)	Reading	Retrieval Process	Instruction	Other	Total
Grade Six:						
Free Inquiry	65 (30.1%)	24 (11.2%)	75 (35%)	6 (2.8%)	44 (20.3%)	214 (100%)
Business	22 (14%)	32 (20.2%)	40 (25.2%)	16 (10.2%)	47 (29.2%)	157 (100%)
Grade Four:						
Free Inquiry	65 (27.3%)	70 (29.5%)	74 (31.3%)	11 (4.75%)	16 (6.85%)	232 (100%)
Business	27 (11.2%)	74 (31%)	70 (29%)	17 (7.1%)	53 (22.1%)	241 (100%)
Grade Three:	20 (8.5%)	82 (34.4%)	76 (32.1%)	9 (3.8%)	49 (20.4%)	236 (100%)
Grade Two:	95 (39.3%)	72 (30%)	27 (11.2%)	16 (6.5%)	25 (10.4%)	235 (100%)
TOTAL:	294 (22.2%)	354 (27.4%)	362 (27.3%)	75 (5.7%)	234 (17.2%)	1315 (100%)

in orienting the children to the use of the tape recorder and slide projector as they were later on. As a consequence the difference in figures here reflect the difference in the efficiency of the research assistants. If we are correct, it points out the fact that the research assistants may need as much help in training children to use mechanical devices as they do in training them to handle the more difficult intellectual tasks. Their attitudes are very important also. At first, several of our assistants actually doubted that children could use the mechanical equipment independently. This belief tended to persist until they had seen the children doing it.

The overall pattern does indicate that while the students did not seem to use the tapes very often as assists in reading they very frequently called on the research assistants for that kind of help. Over 25% of the help given was for reading, although the student who needed help could have turned to a tape.

From this we conclude what we might have suspected before the beginning of the study. That is, that a reader likes to have help directed toward his specific problems, rather than to his general problems. For example, if a youngster was stuck on a particular word, and wished to use a tape to help him, he would have to put the tape on and listen to it to the point where he encountered the word that he was having trouble with. On the other hand, if he simply asked a research assistant for help he received it for the specific word which he was having trouble with. Nearly every request for a help in reading was a request for the pronunciation of a specific word rather than for matters of general meaning. We have concluded that it might be possible to provide for the students an automated glossary based on the knowledge of the particular words which given the greatest difficulty and to employ the automated glossary to reduce the demand of the attendants.

Still in all, when one considers the number of children involved in these studies and the frequency of help given, it does not seem that the amount needed was large in any particular category. Particularly, it appeared that many times the children were asking help simply to be conversational. A youngster might feel somewhat awkward saying, "Oh, Mrs. Green, look what I found out here." But he would feel less awkward saying, "Mrs. Green, can you help me get this slide or get my tape recorder working or read this word." The "other" category of aid given was almost entirely filled with conversational trivia like, "Who is that man on the tape," or "Do the slides all have to be in order?" We believe that many of the requests for aid, particularly those we classified in the "other" column but also many requests for reading, mechanical, and retrieval help were simply conversational contact between the student and the attendant. This may be an important factor in the development of self-administering instructional systems. Students may need to have this kind of contact, and at first we may think that they're asking for help when they're really asking for companionship.

In the third study, when the children worked in groups, aid-given became almost nonexistent, although the task was complicated itself and the group processes lent its own complexity to the situation. Perhaps, working in groups, the children had the companionship which they had to seek otherwise by asking for help.

The Effect of the Category Change on the Requests for Assistance

Let us turn now to the aid which was given when the categories were changed during the "New Category Study". These data will help us assess the difficulties, if any, which were created when the category system was changed but also give us an opportunity to compare the kinds of aid which was requested by children from the almost wholly middle-class environment in which many of the studies were done, in comparison with the needs of the children representing a broad range of socio-economic and intellectual characteristics in the larger studies.

TABLE THIRTY-FIVE

TYPES OF AID GIVEN DURING THE "NEW CATEGORY STUDY"

	Mechanical	Reading	Retrieval	Instructional	Other	Total
Grade Four						
New Category System	15 (17.2%)	31 (35.6%)	4 (4.6%)	3 (3.4%)	34 (39%)	87
Grade Four						
Old Category System	8 (11.3%)	15 (21.1%)	22 (31%)	5 (7%)	21 (28.3%)	71
TOTAL	23	46	26	8	55	158

There were ten subjects in each of these two studies, so it is interesting to notice that the amount of requests for aid or at least the amount of aid given per student was about the same as it was in the Broad River School where the range of abilities and socio-economic backgrounds was much greater.

However, mechanical help was by this time a fairly rare occurrence. Reading continued to be a prominent factor, but the finding here which puzzles us is that there were only four requests for help with retrieval with the use of the new category system where there were twenty-two requests with the old category system. Since aid given during retrieval was almost entirely help in finding a slide and since the children using the new category system were getting an enormous number of slides for each question asked, it does not seem reasonable to expect the kind of finding that occurred here and we can't explain it. Apparently the same amount of total help was needed in both situations. Aid given for reading was greater in the new category system, but that this is expected because the children were getting an awful lot more material to read. But we are puzzled by the difference in aid given for retrieval.

The two general findings of greatest importance here are that the middle-class children seemed to behave about the same with respect to aid given as did the children representing a broader range of backgrounds and also the general finding that the amount of aid given with the two category systems was very similar. There does not seem to be much basis for choosing one over the other on the criterion of administrative ease, taken alone.

SUMMARY

Most of the aid given was for mechanical help, help in reading, especially with specific words, or help in locating particular slides. The mechanical help dropped off as the research assistants became more experienced but help in reading and retrieval continued to be important and during the early stages of inquiry, the children needed some help in operating the tape recorder or the slide projector.

We came to the general conclusion that the amounts of aid given were not excessive. The students had a reasonably easy time using the systems and needed certain kinds of help that could easily be provided by one or two aides for a very large number of children. Further work is needed on the development of self-administering glossaries so that students can have a kind of specific reading help that the tapes were unable to provide, and it appears that the tapes which were prepared at such an enormous expenditure of effort were not as helpful as we had hoped. The tapes were designed to present the same data as the written material. It might be far better to use tapes to present more information and to use other devices as reading aids.

CHAPTER THIRTEEN

CHILDREN'S PREFERENCE FOR TASK STRUCTURE: PROBLEMS IN DESIGN

In this chapter we report a study which did not come off as well as we had hoped. It will be recalled that early in the pilot study it appeared that some students preferred the structured tasks more than the unstructured tasks and that the converse was also true. We therefore attempted using two samples of students--one from the third and one from the fifth grade--to design a study in which students would move from one type of task condition to the other so that we could observe whether the transition affected their behavior. The sample consisted of 30 matched pairs of third grade students and 30 matched pairs of fifth grade students, randomly assigned to two treatment groups. Under Treatment Condition I the student would engage in the free inquiry task and then move to the business task whereas in Treatment Condition II the students would move from the business task to the free inquiry task with the number of students in the two treatments being balanced so that we could take into account the effect of the ordering of the tasks. The focus of the study was to be on the input and output variables to determine whether they fluctuated under the differing task conditions and to determine whether any of the characteristics of the students were related to such fluctuations.

As the data came in, however, it appeared quite obvious that the results from this study were going to be ambiguous. For one thing, in both treatment groups the activity of the children under one set of task conditions affected their performance in the other task. Some students, for example, who had completed the free inquiry task and then were presented with the business task felt that they knew enough about the culture to be able to generate the solution to the business task without engaging in further questions. A similar kind of effect occurred under the other treatment condition: the students who had engaged in the business task feeling satisfied that they were prepared to teach a child about the culture. In other words, each task affected the other to an extent which prevented us from determining the effect that the order of the tasks had on the children. As a consequence, input in one task was affected by input from the other.

With respect to output, the same type of problem arose. Students, having described the culture upon concluding one task, tended not to repeat elements of that description after the second task, resulting in greatly-shortened second tapes.

Evidently, in order to explore such a complex concept as that of learning style and learning environment one would need a very long series of investigation devoted just to that subject with individual students being placed under a considerable variety of conditions and with observations being made of many facets of their behavior so that the regularities in fluctuations, if any, could be detected and replications made on the individuals within the samples.

The input and output variables were analyzed to determine whether there were any differences in the total patterns of students who received a structured task before the unstructured task than the other group, but the treatment had no effect on the input and output variables, aid given, or any other aspect of the behaviors which were under observation.

The general questions relating to learning style are fascinating ones, of course. Learners do prefer certain kinds of environments to others and there probably are regularities in this that are only just beginning to be perceived. Because of the relative precision with which we are able to observe behavior in the setting provided by the Data Storage and Retrieval Systems, it seems promising to utilize them in appropriate studies of considerable length and complexity.

CHAPTER FOURTEEN

INTERPRETING THE RESULTS:

THE DEVELOPMENT OF INFORMATION SUPPORT SYSTEMS FOR CHILDREN

There are three general kinds of implications of the work which is reported herein. One is the direct implications for the development of information support systems for children. The second is the implication for curriculum development in the social studies, and the third is the implications for research using informational systems for children.

The Children's Use of the Information Bank

In investigation after investigation, it was demonstrated that the children from the third grade up and also able middle-class second grade children were able to withdraw and utilize information from the Data Storage and Retrieval Systems. This particular finding seems to be so much what one would have predicted that its significance is not apparent until one realizes that nearly all of the information sources for children in present-day school setting are narrative and linear in nature. That is, the children are presented with books which describe things sequentially and in which information, interpretation, and instruction are combined to one degree or another. Formal information support systems categorized by categories filled with information sources have not characterized the environment of the children.

It is plain from this research that one does not need to package information for children solely within narrative textbooks, tradebooks, concept films, or linear motion pictures which present data, conclusions, and exercises in the same package. One can build, and children will use, information systems designed to provide informational support alone.

Second, the self-administering orientation systems and the self-administering control units which presented tasks to the students were also successful in the sense that the children were able to use them to receive instructions and were able to engage in activity stimulated by them. We think it is reasonable to speculate that one can build such systems to teach children the index systems and how to use them. Also self-administering systems can present to the children ideas from the social sciences (as in the concept-validation study), cultural problems (as in the problem-solving study), and even directions for working together (as in the cultural comparison study). In other words, even at the elementary school level, we can build informational support systems and instructional systems which are largely self-administering.

The types of index systems that are used will affect the behavior particularly of average or less able children (See Chapter Eleven), and it is probably possible to engineer entry systems which will be optimal for the use of those children. The more able students seem to be able to use the kind of complex information systems represented by the human relations area file, probably due to the fact that their problem-solving capacity and flexibility is so great that they adapt their style to the system and learn to exploit it on its own terms.

It would appear from a content analysis of the children's descriptions of the cultures which they have encountered via the Data Storage and Retrieval Systems that the children develop a "feel" for the people and for the problems of the people as well as for the more descriptive aspects of culture. The encounter with the data systems does not seem to have been an impersonal one for the children. They seem somehow to have personalized the information and see that it represents the activity and feelings of real live flesh and blood people.

The structure of the tasks which are given to the children are important in determining their inquiry. Although we were unsuccessful in designing research to validate this question (See Chapter Thirteen), the unqualified evidence appears to us, at least at this point, to be very strong indeed. Some children will thrive under both conditions, some under neither. The results of the learner vs. system initiation study (Chapter Eight) indicated that learner initiation did not increase output. An extensive series of investigations needs to probe the entire area of information utilization and the conditions that effect it. We cannot simply design one kind of inflexible information support system, but we need to design systems which have the capacity of changing shape to conform to the learning styles of the children as well as the requirements of the subject matter.

It appears that groups of children can use the systems as effectively as the individuals, although the groups need to be taught how to engage in discussion and dialogue, both over how to enter the system and how to discuss the information which they retrieve. (See Chapter Seven) There does not seem to be any formidable reason why we cannot design information systems with instruction to groups that will help them study significant problems, retrieve information to those problems, and engage in the dialogue over the implications of their finding.

We found no aspect of the cultures which the children could not engage with once they retrieved information relative to it, although there were definite age differences with respect to the complexity of concepts the children could deal with. Information relative to social status, to the power structure of the communities, to the mythology and legends of the area, seem to be as within the reach of the children as did the more tangible aspects of culture. Apparently, however, the children did not as voluntarily wander into the less tangible areas of culture as they did into the more tangible ones. But once they did enter the less tangible domains, they were able to cope with the information and it did not put them off. It appears worthwhile, then, to include in information systems for children data on the political and social dynamics of the culture, as well as on the economics, geography, and agriculture of the cultures. Comprehensive information such as that represented by the large number of categories of the human relations area file appears to be within the scope of the elementary school child.

The observations of the children lead us to believe that orientation systems can teach them how to use the audio-visual equipment necessary to use a complex multi-media system. The evidence also suggests that effort should be bent to develop a reading assistance system which can provide help with specific words. In the present systems, all the verbal materials were taped as well as written. However, students who had difficulty in reading did not use tapes any more than did students who did not have difficulty with the reading. Further, most of the requests for assistance involved reading difficulties of one sort or another. Particularly, help was needed with the specialized vocabulary pertinent to the particular categories. If data was relative to social status, the help needed was different from that which was needed when one was describing the head men of the community. It appears possible to make an analysis of the kinds of words that the students are likely to need help with and desirable to design a system which will give specific help on those words. For example, we feel that a glossary of the usual terms could be developed in each data storage and retrieval system. Students could be provided with a way of using a high-speed tape recorder to retrieve pronunciation and definitional information relative to the difficult words. Nearly every request for assistance in reading involved help in pronouncing or defining a specific word. The students did not want general help or, in fact, appear to need it. What they did need was pronunciation or definition within the context of the entries concerned. The reading support systems, we conclude, should provide help with specific words rather than general help with reading.

Although many of the second grade students did not inquire to anything like the extent that the older children did, it appears possible to design systems utilizing tapes and pictures which can present many aspects of information to very young children. We speculate from what we have observed that such a "nonverbal" or more precisely "nonreading" system could provide information on a limited number of aspects of culture to very young children indeed. Instead of using tapes as reading aids, they might better be used as information transmitters for the younger children.

It is worth noting that the information systems used in these investigations were designed to be usable by middle-class second grade children. Yet, they covered over six hundred categories of information, and what seems important to us is that they were found useful and interesting by very intelligent sixth grade youngsters. The information sources were comprehensive, and the fact that they were written simply did not put off the older children or the more intelligent ones. However, there does not seem to be any reason why we cannot develop systems that provide levels of complexity in data. That is, one might have a system in which the basic entries were tapes and slides giving a certain amount of information relative to certain categories. Then, one might have additional information in written form or even in other tapes or films for students who wish to inquire further in that area.

In any event, whether students were being asked to learn about the cultures in order to teach other children about them, or find out what businesses would be good to start there, or to compare cultures, or to try to generate solutions to cultural problems, or to find out whether certain concepts used by social scientists would hold true for the cultures, and whether they worked as groups or as individuals, or with large or small category systems, it appeared that the children that we dealt with enthusiastically received the opportunity to dig into informational sources which provided (in their perspective) virtually unlimited information about the cultures. Even after hours of inquiry, the students had not begun to exploit the wealth of information that had been gathered for them, and their persistence and inquiry was such that we needed (to conclude the studies which we had contracted to engage in) actually to engage in procedures which muted the extent and breadth of their inquiry. Data Storage and Retrieval Systems can bring to children in the social studies area information about hundreds of cultures and communities throughout the world. Information systems can be built on ghettos, on nations, on small tribes, on neighborhoods, even on apartment dwellings. We conclude that the research presented herein is sufficient to warrant the assertion that information systems for children utilizing broad category systems dealing with most aspects of cultures are feasible and can be engineered so that they can be utilized by a majority of elementary school children and so that they will adapt to the characteristics of the children as well. Further, they can be combined with self-administering instructional systems that will lead them to explore concepts and modes of inquiry from the social sciences, and significant social problems as well.

CHAPTER FIFTEEN

INTERPRETING THE RESULTS:

CURRICULUM DEVELOPMENT IN THE SOCIAL STUDIES

There is both a positive and a negative side to the implications of this work for curriculum development in the social studies. In the first case it appears possible to support curriculum in the social studies with information systems presenting various world cultures. Second, it appears possible to develop self-administering systems which will present to students cultural problems, attempt to induce them to think productively about social problems, which will present to them concepts and modes of inquiry from the social science, and which will induce them to engage in the exploration of those concepts and the application of those modes of inquiry to the study of cultures and cultural problems.

These are important interpretations of the results partly because of their relationship to the negative aspect of the findings. The negative aspect consists mostly of solid evidence that many children do not engage in spontaneous inquiry into the multivariant solutions of cultural problems or into the intangible aspects of culture. Many children seem to be satisfied with the visually superficial investigation of cultures and cultural problems. Therefore, the importance of the positive side is that it indicates that we may be able to develop self-administering technologies which can, through informational and conceptual input to the children, lead them toward more conceptual analysis of cultures and toward an analysis of those aspects of cultures which, during their natural inquiry, they tend to ignore. Over the mass of this research, for example, students did not in very many cases systematically explore economics, politics, social status, or religion. They appeared to have no defined strategies for analyzing those things, and yet it appears that it is possible to teach them such strategies.

The results of the investigation in which children were presented with social science concepts and asked to apply them to the cultures should be cautionary. (See Chapter Nine.) Without instruction third grade children had difficulty analyzing concepts of considerable complexity although they were able to deal with concepts which represented very little complexity. It may be that complexity as a dimension in concepts is more important than content. In other words, children may be able to use simple concepts to explore many aspects of cultures. Social studies curriculum theorists have generally reasoned that experience determines to an important extent what a child can think about. It has been recommended that young children should study the home and family and other things with which they have had experience rather than studying things far away from them. It may be that complexity is as relevant as experience. Possibly students can engage in simple conceptual analysis of things both near and far away from them, but may have difficulty in complex analysis of any category of human culture. Furthermore, by using Data Storage and Retrieval Systems we may be able to bring to fairly young children information about aspects of the world that have hitherto been denied of them. If we can learn how to put together instructional systems which will induce very young children to engage in the study of simple social problems and concepts then we may bring to them some of the richness of the social world that is far removed from them at the present time.

It definitely appears that groups of children need to be taught to relate to each other over social concepts and problems. Although a good many of the groups in our studies (See Chapter Seven) did engage in discussion and analysis of social problems, in many groups the level of discourse was very low and their concepts were additive rather than interactive. That is, students would add to what one another was saying rather than discussing and integrating what the previous speaker had said. Also conversations among the children were very rarely multi-variant. They tended to examine one concept at a time, and we need to engage in investigating to determine whether we can't build curricular systems which will introduce children to more complex ways of engaging in dialogue with one another.

The fact that the content of the children's cultural analysis did not differ much from grade to grade indicates that present instruction is not drawing the students into new directions of analysis. Particularly, it appears that the children are not learning to analyze the intangible aspects of culture. Yet our experiments, both with social science concepts and with social problems, indicate that it is possible to build instructional systems which will have this effect on the youngsters.

Research to be Done: A Set of Priorities

Research is needed to pin down more precisely what concepts and modes of inquiry from the social sciences can be introduced to the children. It may be that by exposing young children to modes of cultural analysis we will bring more aspects of culture within their reach and thus affect their inquiry substantially. It seems important to learn how to teach children to use social science concepts and modes of inquiry to their social problems. Also, the very promising finding in the present set of studies (Chapter Ten) practice in solving cultural problems affected their solutions to them indicates that it is worthwhile to continue research which will attempt to teach children more complex and productive cultural solutions, and to learn to build curricular systems on such a basis.

The general question of the development of curricular systems that will accommodate to the learning style of students is an enticing one and one which is beyond our reach in the present set of investigations. By using the Data Storage and Retrieval System setting it should be possible to expose youngsters of known characteristics to teaching strategies that vary in known ways, and thus, gradually to build up a set of research findings on which we can engineer curricular systems that have the capacity to mold themselves to the characteristics of the children. Task structure, task complexity, amount of support given, the kinds of organizing units given, the kinds of orientation, the kinds of category systems, the kinds of instruction given previous to inquiry--all these can be varied within reasonably narrow limits to produce a set of investigations on which such an engineering venture can be carried out. Also the work begun in Chapter Nine needs to be extended to develop a map of the social science concepts that children of differing ages and other characteristics can handle, so that we can build curricular systems that will adapt to the conceptual complexity level of the students.

It may be possible in the final analysis to engineer curricular systems consisting of components which: (1) provide conceptual input to students, that is which teach them concepts and modes of inquiry from the social sciences; (2) components which pose important cultural problems to them and induce them to attempt to generate solutions to those problems; and (3) information systems on which they can test out the concepts and modes of inquiry from the social sciences and which they can use are important as the informational basis on which to try generating cultural solutions. If we see culture as a set of solutions to problems, and if we see the dilemmas of today as the need for the generation of new cultural solutions, then it makes good sense not to teach this generation of students simply the kinds of solutions that we have been using in the past, but to build curricular systems on which they can generate fresh solutions and develop the commitment to implement them for the improvement of the conditions under which human kind must live.

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The materials referred to on page 4 are available through the Department of Sociology and Anthropology, University of Georgia.

APPENDIX: SAMPLE MATERIALS

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Appendix B

Observation Periods: Description

1 - (1) This includes observations by archaeologists about the ancestors of the people who now live in La Stella. The old settlements of these people have been found along with the artifacts of their civilization, their tools, pottery and food. Some of their ideas have survived until recently in the form of ceremonies and legends.

2 - (5) This period belongs to the first of what we have come to know as anthropologists. These men had great curiosity about cultures foreign to their own. They and their wives recorded their observations of La Stella in great detail, and were helped by photographers of that time.

3 - (6) During this observation period the field of anthropology was beginning to be looked at as a science. The people who observed La Stella at this time had some training in their field as well as commitment to it. Their interests ranged far, and included such things as ceremonial patterns, songs and legends.

4 - (7,8) With the complete acceptance of anthropology as a field, the people of La Stella are studied now with due regard to the changes which must come about. They are a society in the midst of a larger, highly urbanized and industrialized one, and observations about their culture today must take into account this impact on their traditional ways. Anthropology as a field can no longer study cultures in isolation or as static and unchanging. Observations of La Stella during this period reflect the changes occurring in the anthropological field as a whole.

Appendix C

Free Inquiry - Instructions

Your job is to learn about La Stella by asking questions about it. Each time you ask a question you will be given a number. You take that number to the storage center and pick up the slides that go with the number.

Please keep asking questions until you think that you know enough about La Stella to explain or describe it to someone else. Please let the attendant know when you think you know enough. Then we want you to tell another student about La Stella by making a tape recording that we can send to him.

Each time you show yourself a slide, remember to put its number in one of the three columns on the "sorting slides" worksheet.

Also, remember that each slide is a picture that has another slide that goes with it and tells something about the picture.

If you need help of any kind, as help reading any of the slides, turn the "Attendant" switch to the "On" position and help will come soon.

Last, every set of slides has a tape recording to go with it. If you wish to hear the recording, just ask for it.

Appendix D

SLIDE SORTING TASK

Area File Number__________

Question Number__________

Verbatim Request____________________

Name____________________

School____________________

Date____________________

Task____________________

Sorting Slides

Place the number of each slide you show yourself in one of the three columns below.

Column A	Column B	Column C
These slides told me a lot I was trying to find out.	These slides told me a little about what I was trying to find out.	These slides didn't tell me very much that I was trying to learn.

Appendix E

Subject____________________

Date______________________

Interviewer_________________

FREE INQUIRY
SUMMARY OF SEARCH

Input:

Number of categories searched_____________________

Time to completion_____________________

Number of tapes requested_____________________

Number of requests for assistance_____________________

Apparent enthusiasm	0	1	2	3	4	5
Apparent persistence	0	1	2	3	4	5
Apparent relaxation	0	1	2	3	4	5

Output:

Completeness	0	1	2	3	4	5
Integrativeness	0	1	2	3	4	5
Clarity	0	1	2	3	4	5

Themes Generated___________________________________
(Characterize and summarize them.)

Appendix F

Subject ________________

Date ________________

Aid Given Form

Attendent ________________

Mechanical	Reading	Content	Instructions	Other

Appendix G

Business Problem - Instructions

Some people make their living by making or selling things that are used by other people. When people do this, we say they are businessmen - people who do business.

Different kinds of businesses do well in different kinds of places. For example, businesses that sell or make things for the care of horses do best in places where there are many horses that are used by many people.

Can you find out what would be a good kind of business to start in La Stella? Find out by asking questions about La Stella - questions that will tell you enough about La Stella that you will be able to guess what kind of business would do well there.

Keep on asking questions until you believe you know a good kind of business for La Stella. Then call the attendant and he or she will let you know what to do next.

Remember to put the number of each slide in the right column on the "Sorting Slides" forms. Also, remember that every picture has a slide to go with it that tells something about the slide. Remember, too, that you may choose a tape recording, if you wish, to go along with each set of slides.

If you need help with reading or anything else, please call the attendant.

Appendix H

Content Analysis of Output Tapes

The purpose of this manual is to analyze the contents of the tapes made by the children at the completion of the FREE INQUIRY TASK. The tapes are to be analyzed in terms of the themes and concepts which are generated by the children when they attempt to explain to another child what the La Stella culture is like. In this case theme indicates each aspect of the culture that they mention. For instance, if a child says, "There aren't any chickens in La Stella." then chickens is the theme or aspect which he is discussing. Some themes are developed more elaborately than others. For instance, the theme, chickens might be followed by "There used to be many chickens in La Stella, but people didn't take care of them, and they died." This latter statement is an elaboration on the theme.

While themes deal with aspects of the culture, concepts reflect an attempt to create generalizations from the data. In the protocols from the FREE INQUIRY TASK a concept appears in one of four ways:

1. A child may point out similarities or differences between the La Stella culture and his own. For example, "The children from La Stella play some of the same games we do and some different games."

2. A child may unite disparate facts. "After the Buffalo were killed on the plains, the people of La Stella did not have much trade with the Navajo, because that trade had mostly been in buffalo hides or meat.

3 - (6) During this observation period the field of anthropology was beginning to be looked at as a science. The people who observed La Stella at this time had some training in their field as well as commitment to it. Their interests ranged far, and included such things as ceremonial patterns, songs and legends.

4 - (7,8) With the complete acceptance of anthropology as a field, the people of La Stella are studied now with due regard to the changes which must come about. They are a society in the midst of a larger, highly urbanized and industrialized one, and observations about their culture today must take into account this impact on their traditional ways. Anthropology as a field can no longer study cultures in isolation or as static and unchanging. Observations of La Stella during this period reflect the changes occurring in the anthropological field as a whole.

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Content Analysis of Output Tapes

The purpose of this manual is to analyze the contents of the tapes made by the children at the completion of the Free Inquiry Task. The tapes are to be analyzed in terms of themes and concepts which are generated by the children when they attempt to explain to another child what the La Stella culture is like. In this case theme indicates each aspect of the culture that they mention. For instance, if a child says "There aren't many chickens in La Stella," chickens are the theme or aspect which he is discussing. Occasionally a theme will be followed by some elaboration, the addition of details or explanation. For instance the above theme might be followed by, "There used to be many chickens in La Stella. But people didn't take care of them, and they died." This is a theme, chickens, followed by an elaboration.

While themes deal with aspects of the culture (houses, old men, clothes, etc.) concepts are an attempt to create abstractions from the facts which are given. A concept can occur in any one of four ways.

1. A child can point out similarities or differences in the La Stella culture and his own. For instance he might say "The children in La Stella have more fun than we do. They play more games and have more holidays."

2. A child can attempt to unify disparate facts. "After the buffalo were killed on the plains, the people of La Stella did not have much trade with the Navahoes. Most of the Navaho trade had been with buffalo skins and buffalo meat."

3. A child might infer from the facts which he has learned. An inference could be "The people of La Stella had a very strong religion. The Spanish could not get them to give it up, even when they used force."

4. A child might see some relationships between different aspects of culture. A child might see a relationship between the work the people did and their gods. He could say "When the people of La Stella were fighting with the tribes around them, their gods of war were very important to them. When they weren't fighting, the gods of rain and corn became more important."

Finally the presentations are rated according to how clear, integrative, and extensive they are. These aspects are coded on a 1-5 scale (one being low, five high). Clarity indicates precision of speech and expression. To be high on the integrativeness scale, a child has to have organized the culture aspects into a meaningful whole. Extensiveness indicates length of themes generated and the amount of detail included.

Hello. I'm going to teach you about La Stella. La Stella is in the state of New Mexico and we will be visiting La Stella, by this tape, and I will tell you about the religions, sports, clothes, transportation in La Stella. La Stella, as I told you, is in New Mexico. They	Theme - Location
do not have a mayor, as we do. Instead they have a governor, and they help hold war councils just like the Indians used	Theme - Government Officials Elaboration - War Councils
to, because you see, they are the ancestors of Indians. They have a war leader and medicine man.	Theme - "ancestors" (here probably means descendents) This is a concept noting a similarity between the traditional culture of the Indians and its current manifestation.
They wear the type of clothes that we do except for - they wear bandanas and scarves. The bandana is a thing that you put over your head, that the women wear, and of course you know what a scarf is. The men always work out in the field so they wear blue-jeans and shirts just like our farming men do in our place--wherever we live.	Theme - clothes Concept - similarity between clothes the farmers of La Stella wear and clothes farmers wear elsewhere in America
They have two stores in La Stella. One is on the main road--the one main road that goes through the town. The other one is on the outskirts of the town. La Stella has beautiful countryside	Theme - stores Elaboration - location of stores

and you see a big mountainside covered with snow and it has beautiful fields and everything.	Theme - topography Elaboration - details of topography
The Spanish ones came to La Stella when the old Indians were there and they wanted them to become Catholic, you know--the main three religions in our country is Catholic, Jewish, and Protestant. So the Spanish people are mostly Catholic, so when they came to La Stella, as you know, Cortez conquered Mexico, and they went up into New Mexico and they wanted them to become Catholic so	Theme - history, coming of the Spanish Elaboration - missionary aspect of the Spanish conquest Concept - inference that because the Spanish were Catholic, they wanted others to become Catholic, too
they--but they are Catholic today. Some are Catholic, some still maintain the old religion, of war and rain gods, and sun gods.	Theme - religious differences among the people of La Stella
Their church is called a Kiva and they worship in it and they ask the Rain God and the Sun God, and sometimes other gods to help them with	Theme - Kiva
their fields, with their food, because they need food. So sometimes they call upon other gods like the Earthquake God and the Thunder God not to come down and bring disaster to their fields and their homes.	Theme - gods help to bring the people food and to prevent disasters
They have really crude transportation.	Theme - transportation Concept - crudeness of transportation
They have a car and they have modern conveniences. Almost every town has a--almost every home has a washing machine and some people have sewing machines, and they have phonographs and some people have televisions and every home has a radio and the church has an electric organ.	Theme - possession of cars and modern conveniences Elaboration - specific machines that are in the homes
They have many festivals and on those festivals they have rooster-pulls and foot races and they play baseball.	Theme - festivals Elaboration - sports that occur during festivals
Every summer they have a baseball team.	Theme - baseball team
Some of these festivals are San Antonio Day, and San Juan Day, and many other festivals like that.	Elaboration - specific festivals
They have very good food and things and very good dances and singing and music... Now we shall go back to your school and we hope you had a very nice trip to La Stella.	Theme - food, dances, music Concept - inference that these things are very good

Appendix I

Tapescript of a "Question-Stimulator"

One of the most important things that we can do is to study people. Particularly, we need to study people so that we can understand them better, and so we can learn better how to solve the kinds of problems that face us all, because the interesting thing about studying people is that when you are studying others you are also studying yourself.

Now over the years, people named social scientists have learned gradually better and better ways to study society. A human society is really a collection of people and the social scientist has tried to find out better and better ways of studying collections of people. One of the most important things that has been learned about studying people is to ask better and better questions to guide the study. In the next few minutes we are going to talk about some of the kinds of questions that we have learned to ask that help us to understand the people of the world and which, more important, help us to get the kinds of information about them that we need if we are to think about solving social problems that face us all.

Show yourself the first slide now. This slide illustrates the fact that one of the interesting questions to ask about the people of the world is, How do they communicate to each other? How do they speak? How do they say things? How do they write? And what do they write and say? In this picture you see a slide from the cartoon strip Peanuts. Now a cartoon is an interesting way of saying things. The man who writes Peanuts speaks through the characters of the cartoon strip. He has Snoopy and Charlie Brown and Lucy say things that he wants to say to us. For instance, when Lucy is very cross, she really stands for a lot of other people who are very cross and he tells us something about them through the way he handles Lucy. And, when Linus needs his blanket, Linus really stands for all of us who need security and love and warmth in one way or another have our own blankets. When we study another society or our own, it is important to ask questions that will tell us how people say things to each other, what they say and most important perhaps, why.

Now show yourself the second slide. Another kind of thing that we want to know about a human society is how children are raised. We need to know who takes care of them and how and why. How much love they get and in what way. For example, in some societies children are not picked up a lot or hugged or kissed and they are, in fact, pretty much ignored, and this has an effect on them that lasts all their lives. In other places children are greatly loved and hugged and taken care of and are, in fact, the center of attention in the household and this too affects them all their lives. So another of the kinds of questions that we want to learn to ask when we are studying a people is, How do they raise their children? Who does it? And, what does it mean?

Now show yourself the third slide. Every society has ways of getting food and preparing it. And, if we can learn about that, it can tell us about all sorts of things. It can tell us how they farm, how they handle animals and what they believe in, for eating is much more than a matter of just filling your stomach. In some societies, for example, no one eats meat because it is believed that you should not harm a living thing. In some societies the whole family gathers for the evening meal, and the married children come home with their children and it is a very important family occasion, almost a party and the fact that they do that every night has a lot to do with the way they are toward each other.

Now show yourself the next slide. Clothes are much more than things for keeping us warm or cool. If we study the clothing of a people we can also study the ways they feel about many kinds of things. For example, if clothes change frequently, that is, if they go in and out of style, it tells us something about the changeable nature of that society. Where in some cultures people have been wearing the same clothes for two or three thousand years and that tells us something about the kinship those people feel for the people who have lived there long ago. Some societies have very strong feelings about what you should and should not wear and where you can and cannot wear certain kinds of things. Our society does, for example, have very strong feelings about the clothes you should wear for certain kinds of places. So by studying the clothing of a people, we get many clues to what they are like, what is important to them, and how they handle themselves with each other.

Show yourself the next picture. A home tells us a lot more than what the furniture looks like. It tells us much about what the people think and how they feel about things. In some societies, the home is the center of everything, and people take great care to have objects of art around. In some societies, pictures of the ancestors and the old people dominate the walls and offerings are made every day to these people of the past. By studying the home you can also tell much about the tools of a culture. For example, in this picture, the material used in the floor alone required the work of many men and many machines and many kinds of power that were brought together to make that kind of material and that society also has a system by which many people work and make money which they can spend for things like the material in this floor.

Now show yourself the next slide. Every society works with or against nature in various ways. For example, streams can be sources of power and they can be made very beautiful, or they can be left alone, or things can be dumped in them so that they become ugly. The way a society handles nature, the beautiful and the useful things around it tells you much about the people. In this picture you can see things that were manufactured by very complicated machinery which was operated by very highly trained people and these machines themselves are very complicated and they do all sorts of work for us in various ways. To understand a people we have to learn how they use their nature, how they cooperate with it and how they work against it.

Now show yourself slide number seven. How do people feel? What do they think about? What do they think is the meaning of life? What will they die for? What will they fight for? Do they love others? Do they see other people as friendly or as enemies? What goes on in the minds of people? In order to study a society we need to learn to ask questions like that and to get information about those kinds of things. For the real people live inside their skin not outside.

Now show yourself the last slide. So you can see that when we try to understand another people, we can't just ask one or two kinds of questions. We need to ask all sorts of questions that tell us all sorts of different kinds of things. We need to learn about how livings are made, how goods are produced, what the people think about and what is important to them. We need to know how they make laws and who are the people that are most influential when laws are made. We need to learn how they act when there is trouble, whether they blame others or cooperate with them in solving problems. We need to know what their art is like, and their literature and whether they think learning is important or not. All sorts of things are needed if we are to get inside the skin of the other people of this world and understand them and by understanding them, come to understand ourselves and how to solve our common problems better.

Appendix I

Tapescript of a Self-Administering Task-Orientation Unit

We want to give you a job. Do you remember when you were here before you tried to learn about an Indian pueblo called La Stella, and do you remember that you were able to get information about La Stella by asking questions about it and when you asked a question we gave you information in the form of slides and tapes that you were able to put in your own projector and your own tape recorder? Well, now we have a lot of other information on another town in the United States, this time a town in Massachusetts which we call Prestonport. So on one side of you, you can see the slides and the tapes that can tell you something about La Stella, and on the other side you can see slides and tapes that can tell you something about Prestonport.

Now for this next job that we would like you to do, we have organized you into groups of three people and we want to give each group of three the same job, and the job is this: We want you to find out the ways in which La Stella and Prestonport are like each other or are unlike each other. We want you to figure out the ways that these two places can be compared and contrasted with each other.

Once again, we want you to get information about these places by asking questions and each time that you ask a question, we will give you a number as before, and you can take that number to the Storage Center and get your information and when you are done, once again we want you to make a tape recording in which you describe the ways these places are like each other and different from each other. The difference between this job though, and the way you worked before, is that we want you to work in your groups of three as you try to solve this problem. So with your group we want you to decide which questions to ask and then what kinds of things to put on your tape recording. In fact, when you feel that you are all done, that is when you have learned the ways in which these two towns are like each other and are different from each other, then we would like you to simply discuss these things into the tape recorder.

So, when you feel that you've solved the problem of how these places compare with each other, then you call one of us and we will bring you a tape recorder and a tape so that you can have that discussion. Besides that, from time to time, we are going to leave the tape recorder on when your group is discussing what questions to ask, and when you are showing slides to one another, and listening to tapes together. But you don't need to pay any attention to this, one of us will set up the tape recorder and fix the tapes for that purpose.

Now, do you have the job straight? If you don't, call the attendant and she will help you get organized. Otherwise, if you think you are ready, just decide among yourselves what questions you are going to ask first as you try to compare La Stella and Prestonport, call the attendant, ask your question, and you are off.